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United States
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Agricultural
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Extension
Service



Soil
Conservation
Service



ACCOMPLISHMENTS

OF THE USDA

HYDROLOGIC UNIT AREA

PROJECTS

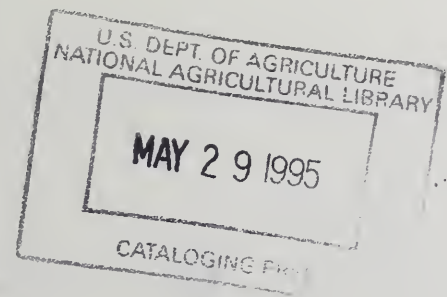
June 1993

**United States
Department of
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FOREWORD

Hydrologic Unit Area (HUA) projects are small watersheds, typically encompassing portions of one or two counties in size, that are focused on pollution prevention in representative agricultural sites. These 74 sites cover all the major crops and livestock grown in the United States under a range of geologic and climatic conditions. They are administered jointly by three agencies within the United States Department of Agriculture. The agencies are the Agricultural Stabilization and Conservation Service (ASCS), the Extension Service (ES), cooperating with the Land Grant Colleges and Universities, and the Soil Conservation Service (SCS). Their responsibilities are to provide financial, educational, and technical assistance to farmers and ranchers in order to reduce non-point source pollution. The impacts of these projects are long term, and benefits will accrue beyond the life of the project.

The goal in creating this document is to have a comprehensive report on the HUA projects that accurately reflects the environmental impacts of non-point source pollution practices. While many of the activities listed can be construed as impacts, they have not been listed as such because they are intermediate actions or practices for which the results have not yet been measured and/or reported. We hope that this description of the HUA projects can help in identifying similar projects, innovative solutions, contacts, and in relating your project with the national program and its potential impacts. Our intent is to update this report on an annual basis so that we may use it with other agencies, departments, Congress, and groups. Since this document was extracted from annual accomplishment reports prepared by the States, it reflects significant variability. Future guidelines will be developed to enhance consistency of reports.

One of the successes of the projects is the collaboration of a wide variety of agencies and private groups to assist in monitoring, research and public participation focused on environmental protection. The cochairs of the HUA education, technical, and financial assistance committee are James McMullen of ASCS, Andrew Weber of ES, and Peter Tidd of SCS. Members of the HUA management team are Grady Bilberry of ASCS, Denis Ebodaghe and Mary Ann Rozum of ES, and David Sawyer of SCS. Suggestions for improvement would be appreciated.

Compiled by Denis Ebodaghe

June 1993

YAM

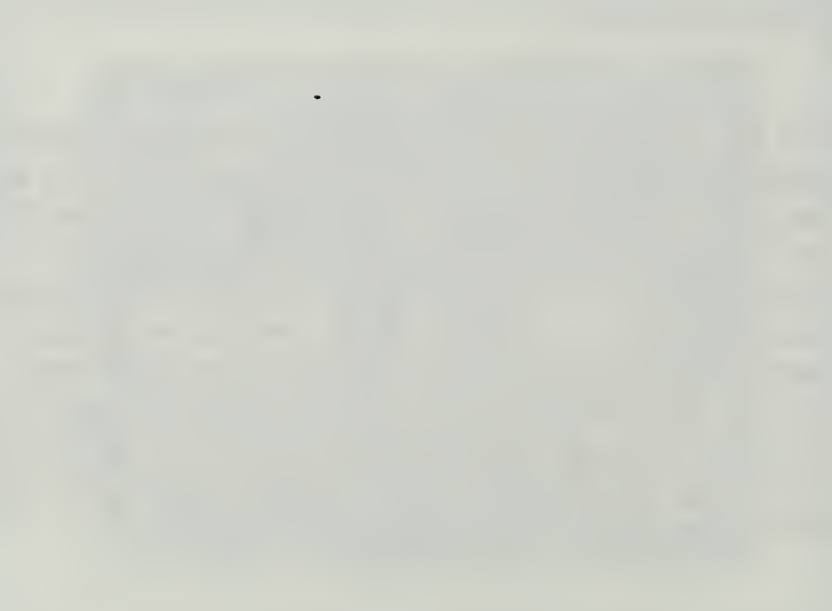
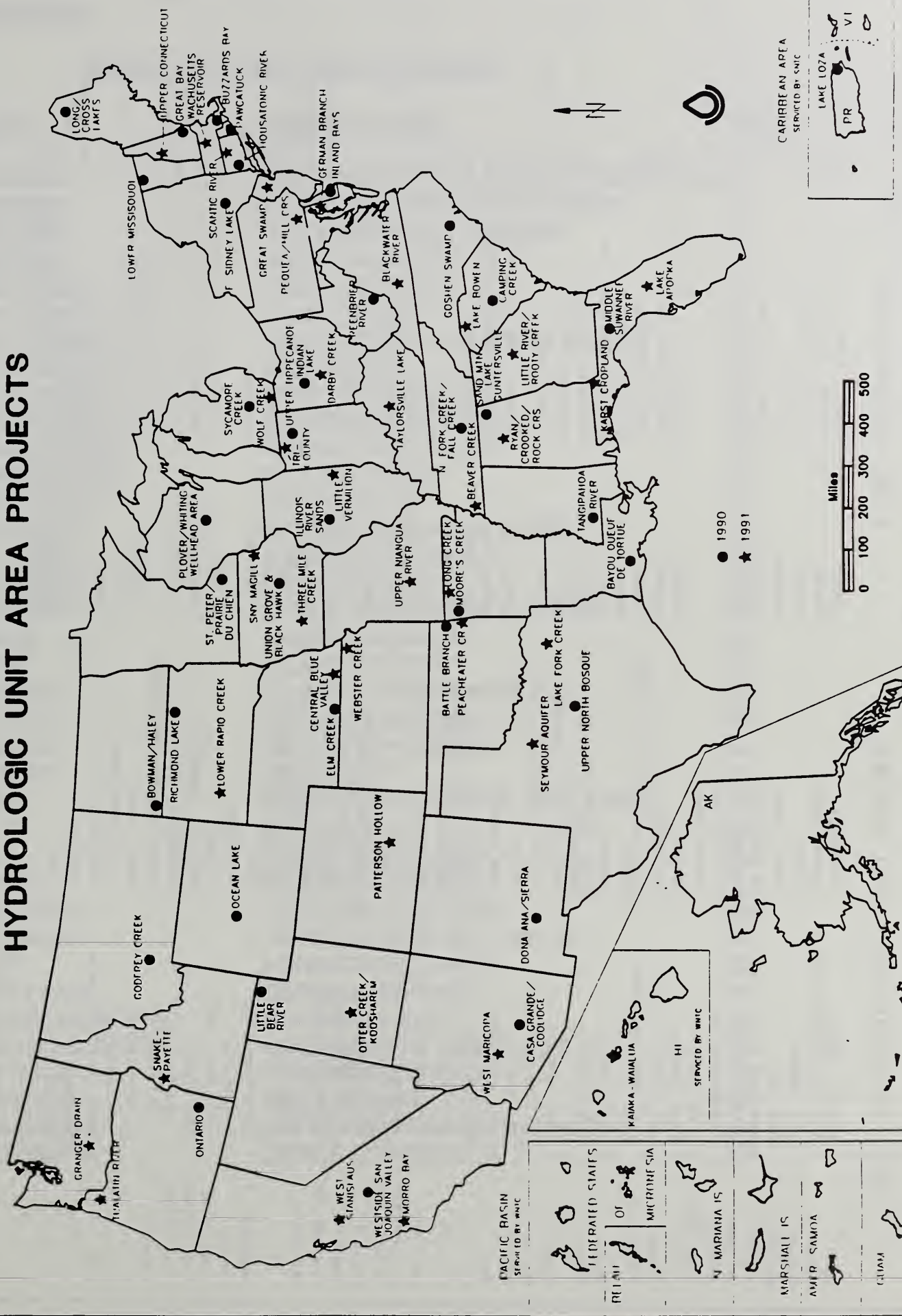


FIGURE 1 HYDROLOGIC UNIT AREA PROJECTS



SOURCE
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1991 HYDROLOGIC UNIT AREAS

STATE	PROJECT NAME	COUNTY(S)
ALABAMA	RAVINE CROCKETT/ROCK CREEKS	CHILMAN, WINSTON
ARIZONA	WEST MARICOPA	MARICOPA
ARIZONA	LONG CREEK	CARROLL, ROONE
CALIFORNIA	MORRIS BAY	SAN LUIS OBISPO
CALIFORNIA	WEST SIERRA LAUS	STANISLAUS
CALIFORNIA	PATTERSON HOLLOW	OTERO, PUEBLO
CONNECTICUT	SCARLE RIVER	HARTFORD, TOLLAND
FLORIDA	KARST CROPLAND	JACKSON
FLORIDA	LAKE APOPKA	LAKE, ORANGE
GEORGIA	LITTLE RIVER/ROOTY CREEK	JASPER, MORGAN, NEWTON, PUTNAM, WALTON
HAWAII	KAIKUA-WAIAUA	HONOLULU
IDAHO	SHAKE-PAYETTE	ADAMS, CANYON, GEM, PAYETTE, WASHINGTON
ILLINOIS	LITTLE VERMILION	CHAMPAIGN, EDGAR, VERMILION
INDIANA	TIPI COUNTY	LA PORTE, MARSHALL, ST. JOSEPH
IOWA	SHU MAGILL	CLAYTON
IOWA	THREE MILE CREEK	ADAIR, UNION
KANSAS	WERTER CREEK	BROWN, NEHAWIA
KENTUCKY	TAYLORSVILLE LAKE	ANDERSON, BOYLE, MERCER, NELSON, SHELBY, SPENCER
KENTUCKY	CELEMAN PATCH	QUEEN ANNE'S
MASSACHUSETTS	WACHUSETTS RESERVOIR	WORCESTER
MICHIGAN	WOLF CREEK	LENAWEE
MISSISSIPPI	UPPER NANGUA RIVER	DALLAS, LACLEDE, WEBSTER
MISSISSIPPI	UPPER BLUE VALLEY	GAGE, JEFFERSON, SALINE
MISSISSIPPI	UPPER CONNECTICUT	GRAFTON
MISSISSIPPI	GREAT SWAMP	MORRIS, SOMERSSET
MISSISSIPPI	DARBY CREEK	CHAMPAIGN, FRANKLIN, LOGAN, MADISON, PICKAWAY, UNION
MISSISSIPPI	PEA RIVER CREEK	ADAIR
MISSISSIPPI	TIAMATIN RIVER	WASHINGTON
MISSISSIPPI	FEQUEA/MIL CREEKS	LANCASTER
MISSISSIPPI	LAKE BOWEN	GREENVILLE, SPARTANBURG
MISSISSIPPI	LOWER RAPID CREEK	PENNINGTON
MISSISSIPPI	BEAVER CREEK	PAYETTE, HAYWOOD, SHELBY, TIPTON
MISSISSIPPI	SE HANCOCK CREEK	WASKELL, KNOX
MISSISSIPPI	LAKE FORK CREEK	HOPKINS, RAINS, WOOD
MISSISSIPPI	OTTIE CREEK/KOOSHAREM	PLUTE, SEVER
MISSISSIPPI	BLACKWATER RIVER	FRANKLIN
MISSISSIPPI	GRANITE DAM	YAKIMA

1990 HYDROLOGIC UNIT AREAS

STATE	PROJECT NAME	COUNTY(S)
ALABAMA	SAND MIN/LAKE CUMBERVILLE	WADSWORTH, DE KALB, JACKSON, LAMAR
ARIZONA	CASA GRANDE/COCHISE	COCHISE
ARIZONA	MOHAVE CREEK	MOHAVE
CALIFORNIA	WATERSHED SAN JOAQUIN VALLEY	ALBUQUERQUE, BERNILLO, COLAR, GILBERT, IMPERIAL, KERN, LOS ANGELES, MONTEREY, SAN BENITO, SAN JOAQUIN, SANTA BARBARA, SANTA CRUZ, SANTA RITA, TULARE, YUBA
CONNECTICUT	HOUSATONIC RIVER	FAIRFIELD, HARTFORD, MIDDLESEX, NEW HAVEN, TOWNSEND
DELAWARE	ISLAND BAYS	DELAWARE
FLORIDA	MIDDLE SUWANNEE RIVER	ALACHUA, GULF, SUWANNEE
ILLINOIS	ILLINOIS RIVER SANDS	MAISON
INDIANA	UPPER TIPPECANOE	BOONE, TIPPECANOE
IOWA	UNION GROVE AND BLACK HAWK	JACKSON, MARSHALL
LOUISIANA	RAYON QUELIE DE TORTUE	ACADIA, VERMOREL, LAFAYETTE
MAINE	LONG/CROSS LAKES	ANDROSCOGG
MASSACHUSETTS	RIZZARDS BAY	PLYMOUTH, ROCKFORD, WAREHAM
MICHIGAN	SACAMORE CREEK	IPSEWICH
MINNESOTA	ST. PETER/FRAIRIE DEL CUIEN	OTWELL
MISSISSIPPI	TANGIPAHOA RIVER	IBAT, ABILE, TULOH
MONTANA	CORREY CREEK	CALHOUN
NEBRASKA	ELM CREEK	WEBSTER
NEBRASKA	GREAT BAY	DEWEY, GARDNER, HENRIETTA
NEW HAMPSHIRE	DOHA ANA CREEK	DOUGLAS, GERRARD
NEW MEXICO	EAST SIENY LAKE	DELANO, GILBERT
NEW YORK	GOSHEN SWAMP	DECATUR
NORTH CAROLINA	HOWARD LAKES	DECATUR
NORTH DAKOTA	IRISHMAN LAKE	HOWARD
OHIO	BATTLE BEACH	LOGAN, HARRIS
OKLAHOMA	ONTARIO	DELANO
OREGON	LAKE LOIZA	DELANO
PUERTO RICO	PAWCATUCK	LAKE LOIZA, RIO GRANDE, RIO SAN JUAN
RHODE ISLAND	CAMPING CREEK	WASHINGTON
SOUTH CAROLINA	PICKWICK LAKE	DECATUR, NEWBERG
SOUTH DAKOTA	N. FORK CREEK, TALL CREEK	DECATUR, NEWBERG
TENNESSEE	UPPER NORTH ROSKOE	DECATUR, NEWBERG
TEXAS	LITTLE BEAR PLATE	DECATUR
UTAH	LOWER MISSISSIPPI	DECATUR, LAMAR
VERMONT	CUMBERVILLE RIVER	DECATUR
WEST VIRGINIA	FLOWER WOODS, WELLSHEAD AREA	DECATUR
WISCONSIN	OCEAN LAKE	DECATUR
WYOMING		

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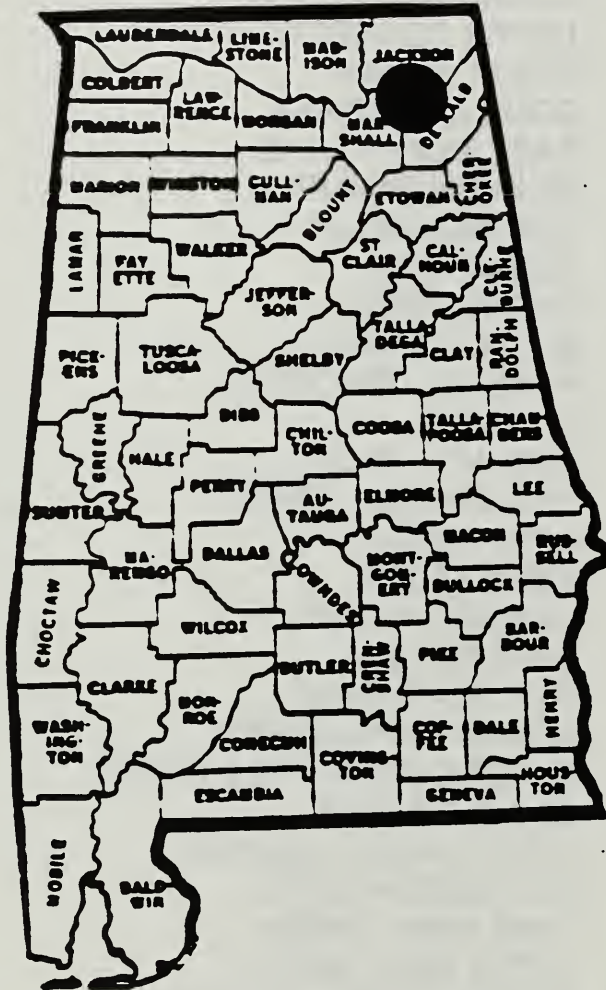
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Alabama



● Sand Mountain/Lake Guntersville

STATE: ALABAMA

PROJECT SIZE: 400,800 acres.

PROJECT NAME: SAND MOUNTAIN/LAKE
GUNTERSVILLE

STARTED: 1990

COUNTIES IN PROJECT: MARSHALL, DE KALB, JACKSON, ETOWAH

CROPS/LIVESTOCK: Corn, soybeans, wheat, swine, beef, poultry, and dairy.

OBJECTIVES: Reduce sediment load in area streams and reservoirs; reduce nutrient and bacterial load in surface and subsurface waters.

IMPACTS:

- ◆ Reduced overflow from animal waste lagoons.
- ◆ Reduced nitrogen (N) application an average of 1,008 lbs/acre/year.
- ◆ Reduced phosphorus (P_2O_5) application an average of 921 lbs/acre/year.

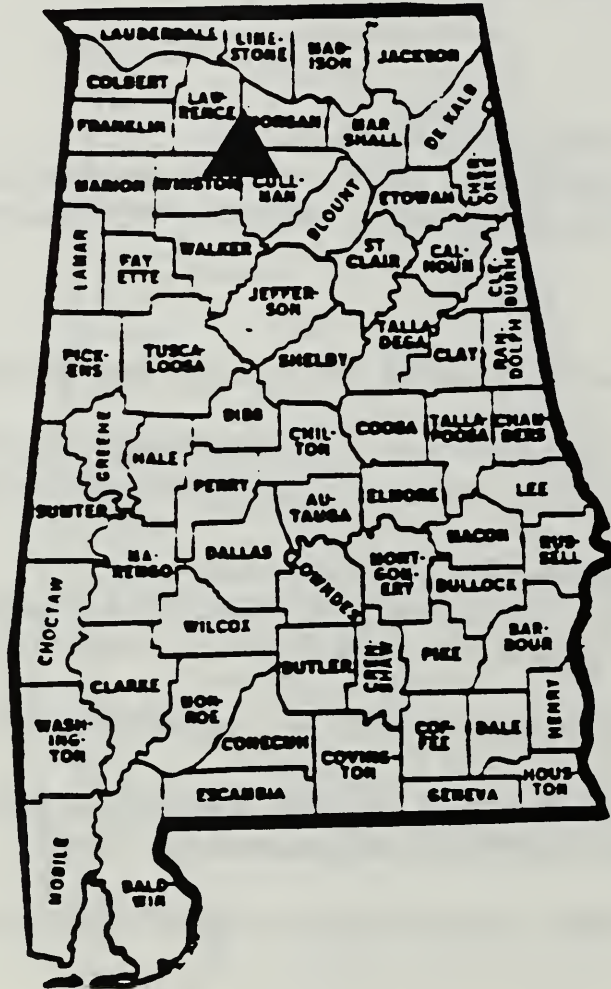
ACTIVITIES:

- ◆ Conducted a study on marketing poultry litter as cattle feed, soil amendment and fertilizer.
- ◆ Utilized eight Resource Management farms to demonstrate that farmers following a complete farm management plan can reduce soil losses to tolerance and still maintain farm income.
- ◆ Implemented long term agreements with producers.
- ◆ Studied the effectiveness of constructed wetlands at Sand Mountain Substation.
- ◆ Cooperated in the installation of alternative design of on-site septic systems in the project.
- ◆ Thirty-one producers have installed erosion and sediment control practices.

OTHER AGENCIES: Tennessee Valley Authority, Alabama Department of Agriculture, Alabama Experiment Station, and Alabama Department of Health.

REPORTING & EVALUATION: Monitor tributary streams; sample wells and springs.

Alabama



▲ Ryan/Crooked/Rock Creeks

STATE: ALABAMA

PROJECT SIZE: 248,800 acres:

PROJECT NAME: RYAN/CROOKED/ROCK CREEK**STARTED:** 1991

COUNTIES IN PROJECT: CULLMAN, WINSTON

CROPS/LIVESTOCK: Corn, soybeans, wheat, hay, poultry, swine, dairy, and beef.

OBJECTIVES: Reduce the level of nutrients, bacteria and sediment in area streams and lakes; reduce the level of nitrates and bacterial contamination in groundwater; control erosion; implement long range program in water and land treatments.

IMPACTS:

- ◆ Increased farmer awareness concerning animal waste management within the project.
- ◆ Solutions to water quality problems are being taught to the citizens in the project.

ACTIVITIES:

- ◆ The information and demonstration effort included 51 special interest County meetings, 11 tours/demonstrations, 1 exhibit, 3 newsletters and 1 trade show.
- ◆ Farmers are being encouraged to reduce overflow from animal waste lagoons.
- ◆ A dead bird fermentation project has been implemented on a farm in Cullman County to dispose of dead birds.
- ◆ Agronomic practices that have been installed include strip cropping, vegetated buffer strips and grassed waterways.
- ◆ Twenty-one waste management systems have been installed to assist farmers in applying poultry and livestock waste at proper rates.
- ◆ Fencing installed on 8 farms to exclude livestock from streams
- ◆ Alternate water supplies have been developed on 15 livestock farms.
- ◆ Two failing animal waste systems upgraded to meet standards and specifications.
- ◆ Pasture and nutrient management plans have been developed.
- ◆ There are 34 specific action items targeted to address immediate and long-range nutrient and bacterial load reductions for 1993.
- ◆ A total of 2,327 agricultural producers, landowners, agricultural industry personnel, and homeowners received education and training in 1992.

OTHER AGENCIES: Cullman County Health Department, Alabama Department of Environmental Management, U.S. Geological Survey, Fisheries Department at Auburn University, and Environmental Protection Agency.

REPORTING & EVALUATION: Collect baseline data, perform biological and water sampling, and perform rainfall event sampling.

Arizona



● Casa Grande/Coolidge

STATE: ARIZONA

PROJECT NAME: CASA GRANDE/COOLIDGE

COUNTY IN PROJECT: PINAL

PROJECT SIZE: 670,000 acres.

STARTED: 1990

CROPS/LIVESTOCK: Cotton, wheat, barley, alfalfa, sorghum, pecans, grapes, melons, and vegetables.

OBJECTIVES: Reduce loss of nitrate nitrogen below the root zone.

IMPACTS:

- ◆ In 1992 the project can document 948 acres, under Long Term agreements, converted to the Improved System (85% Irrigation Efficiency). In addition, 1,000 to 1,200 acres have converted to the improved System to reduce nutrient leaching and save water.

ACTIVITIES:

- ◆ Monitoring of loss of pesticides below the root zone has not detected any pesticide movement below the root zone.
- ◆ Trends showing improvement or degradation of groundwater quality have not been seen to date, based on ongoing analysis.
- ◆ Developed a nitrate database for well location, sampling data and nitrate concentration.
- ◆ Promoted conservation plans and cost share programs.
- ◆ Implemented 11 long term agreements in 1991 with producers.
- ◆ Completed land leveling on 349 acres of cropland for better water distribution to reduce leaching.
- ◆ Conducted tours, fairs, in-service training, meetings, to promote water quality.
- ◆ Planned and implemented conservation practices on 2,378 acres of cropland.
- ◆ Planned and implemented nutrient and pesticide management practices.
- ◆ Published brochures, factsheets, news articles, to promote project goals.

OTHER AGENCIES: USDA-Agricultural Research Service, Arizona Department of Environmental Quality, USDA-Cooperative State Research Service.

REPORTING & EVALUATION: Evaluate impacts of grower irrigation and nutrient management practices including sampling, to observe movement out of the root zone and into the shallow vadose zone.

Arizona



▲ **West Maricopa**

STATE: ARIZONA
PROJECT NAME: WEST MARICOPA
COUNTIES IN PROJECT: WEST MARICOPA

PROJECT SIZE: 1.2 million acres.
STARTED: 1991

CROP/LIVESTOCK: Cotton, wheat, alfalfa, barley, vegetables, dairy and beef cattle.

OBJECTIVES: Reduce potential for leaching nitrogen fertilizer into the aquifer.

IMPACTS:

- ◆ Installed agricultural waste management practices to reduce nutrient losses to leaching and runoff.
- ◆ Improved irrigation efficiency by saving 31,101 acre inch of water over 3,820 acres.
- ◆ Increased public awareness of reducing nonpoint source pollution.

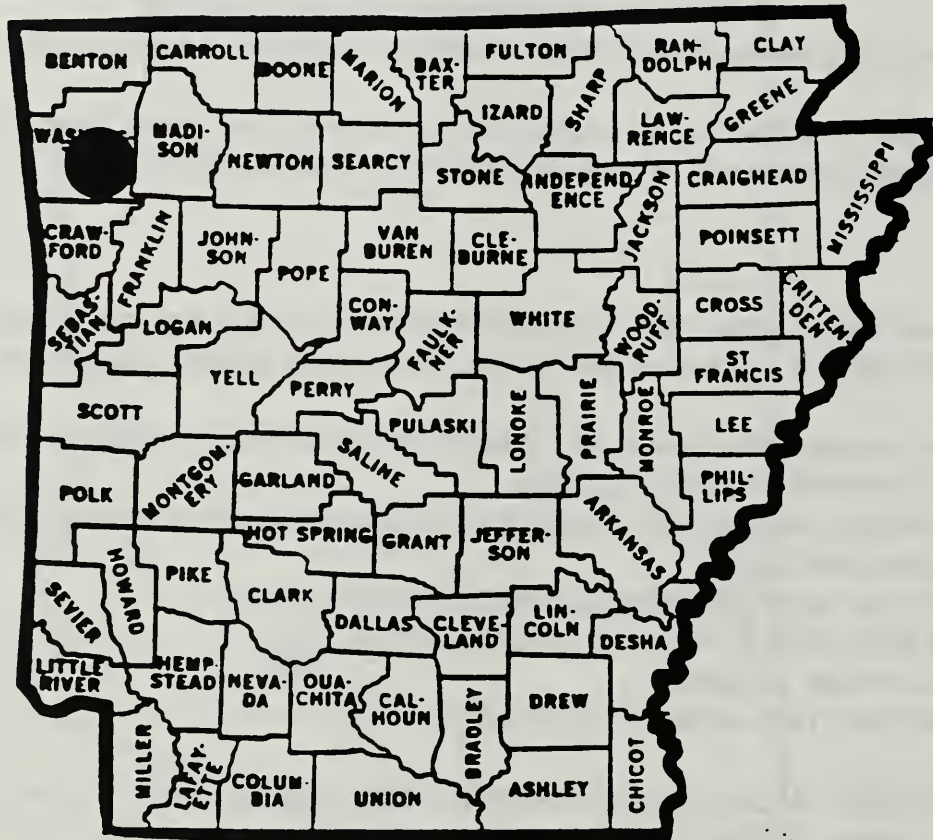
ACTIVITIES:

- ◆ Irrigation land leveling has been completed on some of the sloping croplands.
- ◆ Professional quality 4'x 6' poster describing the purpose of the HUA projects has been produced.
- ◆ Specific and general information has been developed and provided to farming and non-farming clientele through meetings.
- ◆ Agricultural waste management practices have been installed to reduce nutrient losses due to leaching and runoff.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Established field plots to evaluate field operations.
- ◆ Developed a nitrate database.
- ◆ Implemented long term agreements (LTAs).

OTHER AGENCIES: Arizona Department of Environmental Quality, Arizona Department of Water Resources, USDA-Agricultural Research Service, and the U.S. Geological Survey.

REPORTING & EVALUATION: Monitor vadose zone, prepare user-friendly database, water supply sampling, and chemical monitoring.

Arkansas



● **Moore's Creek**

STATE: ARKANSAS
PROJECT NAME: MOORE'S CREEK
COUNTIES IN PROJECT: WASHINGTON

PROJECT SIZE: 47,122 acres.
STARTED: 1990

CROPS/LIVESTOCK: Soybeans, sorghum, wheat, orchards, pasture, and poultry.

OBJECTIVE: Reduce nitrogen and phosphorus transport in the watershed.

IMPACTS:

- ◆ Adopted improved application of manure from:
 - 1,750 dairy cattle on 271 acres
 - 12,320 swine on 294 acres
 - 2,586,000 poultry on 184 acres.
- ◆ Improved water quality in Lincoln Lake.

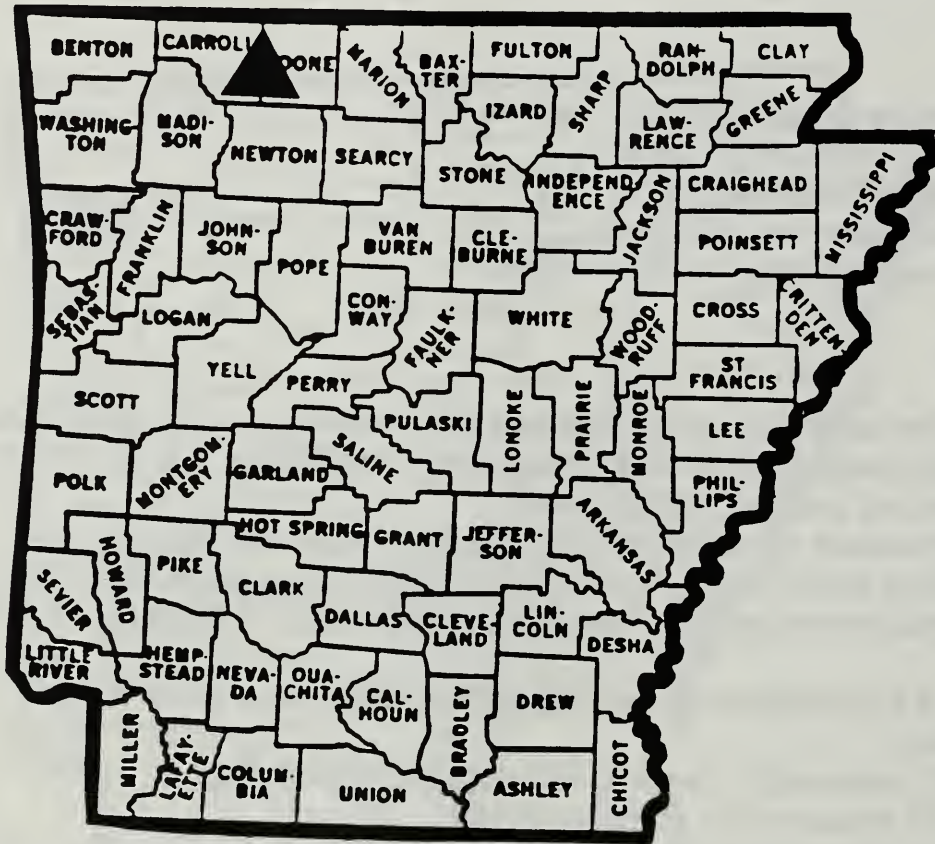
ACTIVITIES:

- ◆ Published news articles, brochures and factsheets to promote water quality.
- ◆ Conducted one-on-one interviews, meetings, TV programs, and tours on project goals.
- ◆ Conducted soil tests on 11,000 acres.
- ◆ Promoted nutrient management with 105 farmers on the 11,000 acres.
- ◆ Established a waste management demonstration farm raising poultry and beef cattle.
- ◆ Implemented twenty-two long term agreements with producers, 13 in 1991 and 9 in 1992.
- ◆ Completed 63 groundwater tests along with 180 surface water tests for nitrates and phosphates.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Installed 30 conservation practices in 1990.
- ◆ Established conservation plans to promote nutrient management on 22,927 acres.
- ◆ Established 5 dead bird composting sites.
- ◆ Processed 243 water samples.
- ◆ Processed 334 soil samples for phosphorus fixation.
- ◆ Added 12 other demonstration sites.

OTHER AGENCIES: U.S. Geological Survey, and the Arkansas Department of Pollution Control and Ecology.

REPORTING & EVALUATION: Test local wells and springs for nitrates; sample lakes to establish nutrient levels.

Arkansas



▲ Long Creek

STATE: ARKANSAS
PROJECT NAME: LONG CREEK
COUNTIES IN PROJECT: CARROLL, BOONE

PROJECT SIZE: 96,574 acres.
STARTED: 1991

CROPS/LIVESTOCK: Fruits, grain sorghum, wheat, poultry, swine, dairy, and beef cattle.

OBJECTIVES: Reduce nitrogen and phosphorus levels; reduce nutrients and bacteria delivered to Table Rock Lake; quantify surface and groundwater effects of conservation; install conservation practices.

IMPACTS:

- ◆ Thirty percent reduction in nutrient loading has occurred in the watershed.

ACTIVITIES:

- ◆ News articles, newsletters, television coverage, and radio spots serve to promote water quality.
- ◆ Promoted conservation planning and cost share programs, 107 water quality and conservation plans have been written covering 18,700 acres.
- ◆ Soil testing has been done on 145 farms with 19,750 acres of crop or pasture land and 32,000 total acres. One-hundred and forty-five ground and surface water tests have been collected.
- ◆ One-hundred and twenty-three poultry manure samples have been analyzed as fertilizer feed.
- ◆ Eighteen dead bird composters and 3 stacking sheds built.

OTHER AGENCIES: U.S. Geological Survey, Arkansas Department of Health, and the Environmental Protection Agency.

REPORTING & EVALUATION: Water monitoring, evaluate surface and groundwaters for nitrates, test soil samples, monitor edge of field sites, collect water samples, and measure secchi disk.

California



● **Westside San Joaquin**

STATE: CALIFORNIA

PROJECT SIZE: 600,000 acres.

PROJECT NAME: WESTSIDE SAN JOAQUIN VALLEY **STARTED:** 1990

COUNTIES IN PROJECT: FRESNO, MERCED, KINGS

CROPS/LIVESTOCK: Cotton, tomatoes, lettuce, cantaloupes, alfalfa, vegetables, almonds, and corn.

OBJECTIVES: Reduce subsurface drainage, and develop groundwater/soil salinity through improved irrigation water management.

IMPACTS:

- ◆ Reduced salts in over 2,000 acres of land.
- ◆ Installed conservation practices, 8 growers installed subsurface drip irrigation; 2 growers installed tailwater recovery systems, 16 growers installed 43,160 ft. of irrigation pipe to replace open ditches.

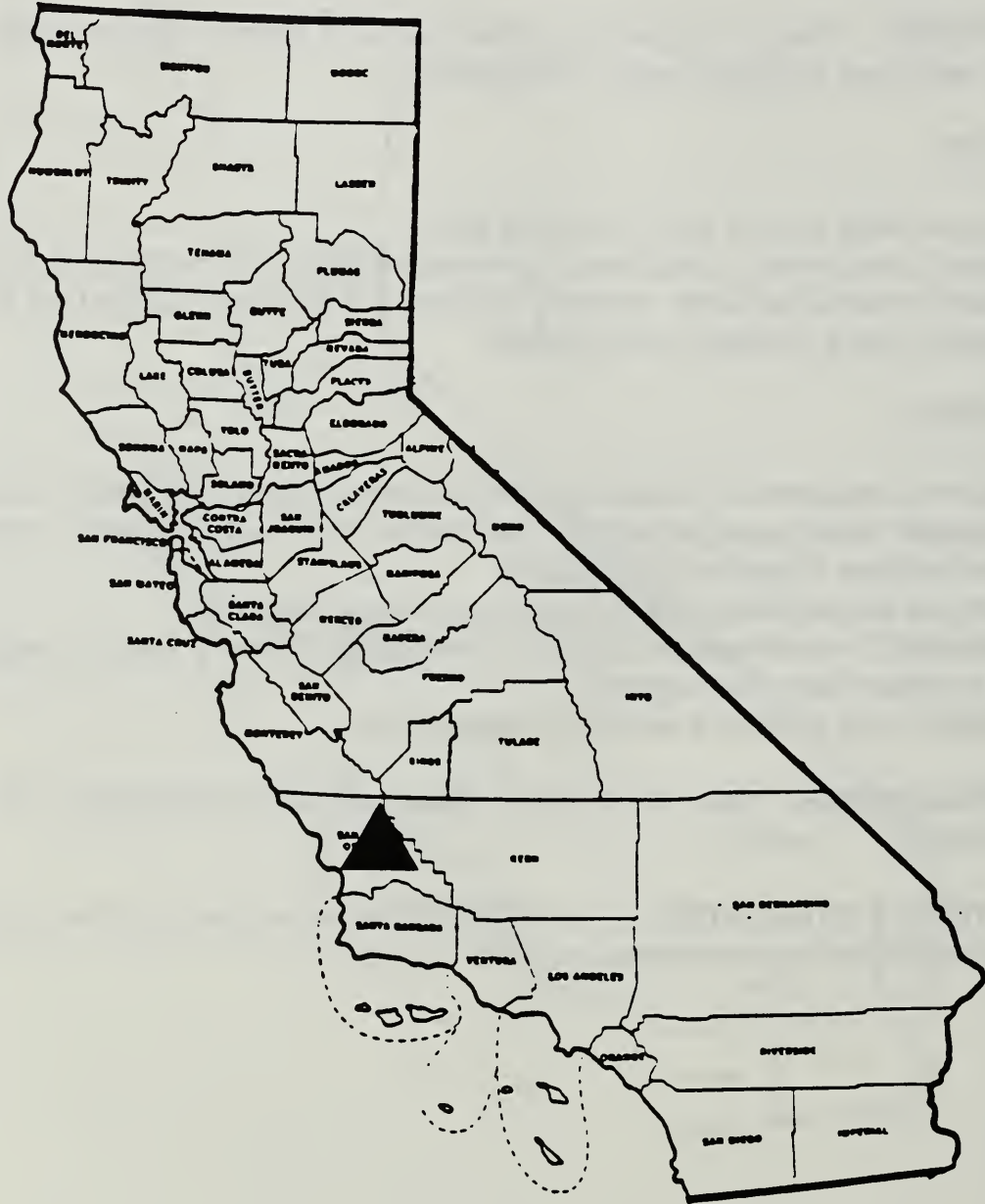
ACTIVITIES:

- ◆ Published newsletters, brochures and factsheets to promote water quality.
- ◆ Developed handbooks on salinity management and surge irrigation. Draft handbook on low-volume irrigation is completed.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Conducted 8 workshops on salinity management, furrow irrigation, surge irrigation, and irrigation water management.
- ◆ Installed more than 25 practices in agroforestry.

OTHER AGENCIES: Water Management Research Lab (USDA-ARS), U.S. Salinity Lab (USDA-ARS).

REPORTING & EVALUATION: USDA-Soil Conservation Service is the reporting agency, estimate changes in groundwater quality.

California



▲ Morro Bay

STATE: CALIFORNIA
PROJECT: MORRO BAY
COUNTIES IN PROJECT: SAN LUIS OBISPO

PROJECT SIZE: 48,500 acres.
STARTED: 1991

CROPS/LIVESTOCK: Beef cattle, non-irrigated field crops, irrigated vegetables, diverse wildlife and plants (including endangered species), fish (including shellfish).

OBJECTIVES: Reduce impacts of sediment and other pollutants on streams, wetlands and Morro Bay estuary, and to reduce soil erosion in the watershed.

IMPACTS:

- ◆ Completed conservation practices in rangeland, cropland, riparian areas and an abandoned landfill that showed a marked increase over previous years.
- ◆ There has been an increased awareness in the project by landowners and the general public about the need to reduce the impacts of pollutants.

ACTIVITIES:

- ◆ Conducted meetings on non point source pollution, workshops on conservation plans and practices, and tours of the watershed.
- ◆ Developed 4-H watershed science curriculum for youth of ages 9-12. Conducted 4-H training sessions and camps which included collecting stream flow and fish and wildlife data.
- ◆ Prepared news articles, brochures, fact sheets and poster displays to promote project goals.
- ◆ Implemented long-term agreements which have influenced soil savings.
- ◆ Promoted conservation plans and cost-share programs through meetings, field tours, press releases, letters, fact sheets and personal visits.

OTHER AGENCIES: Environmental Protection Agency, California Coastal Conservancy, Central Coast Regional Water Quality Control Board.

REPORTING & EVALUATION: Monitor riparian and range vegetation and quantify water in four subwatersheds, and evaluate the effects of the installation of conservation practices on crop and rangelands. A geographic information system (GIS) was used to develop sediment reduction estimates.

STATE: CALIFORNIA
PROJECT NAME: WEST STANISLAUS
COUNTIES IN PROJECT: STANISLAUS

PROJECT SIZE: 129,000 acres.
STARTED: 1991

CROPS/LIVESTOCK: Beans, peas, tomatoes, broccoli, cauliflower, spinach, sugar beets, irrigated corn, cherries, apples, peaches, nectarines, pears, and plums.

OBJECTIVES: Reduce sediment loading from the watershed; monitor and evaluate non-point source pollution conditions.

IMPACTS:

- ◆ Irrigation efficiency increased from 54% to 78% with water application decreasing from 50 inches to 37 inches on 1,886 acres.

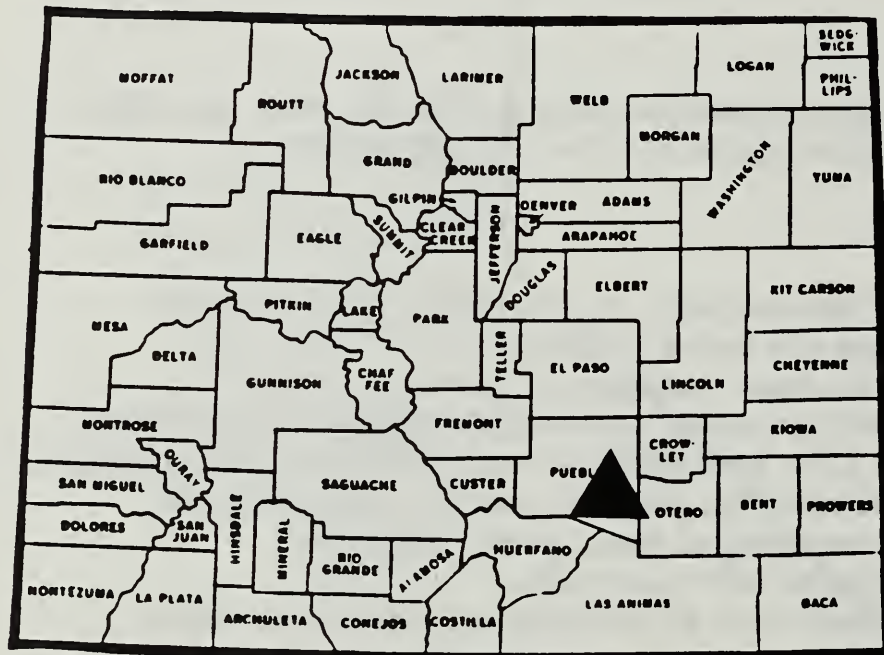
ACTIVITIES:

- ◆ Developed a field demonstration site to quantify nonpoint source pollution associated with furrow irrigation.
- ◆ Developed irrigation water management videos.
- ◆ Cost-sharing under agricultural conservation program (ACP) and long term agreements (LTA) were utilized to reduce sediment load in streams.
- ◆ Interacted and promoted the project's goals through workshops, one-on-one field consultations, tours, grower information, publications, brochures, and newsletters.
- ◆ Developed a Spanish video on controlling erosion and minimizing sediment movement.
- ◆ Conservation practices were applied on 3,713 acres with 42 producers.

OTHER AGENCIES: Resource Conservation District, U.S. Navy, Central Valley Regional Water Quality Control Board.

REPORTING & EVALUATION: Models will be used to evaluate the volume of sediment generated in irrigated fields; Monitor and demonstrate the effectiveness of best management practices on controlling pollutants.

Colorado



▲ **Patterson Hollow**

STATE: COLORADO
PROJECT NAME: PATTERSON HOLLOW
COUNTIES IN PROJECT: OTERO, PUEBLO

PROJECT SIZE: 89,850 acres.
STARTED: 1991

CROPS/LIVESTOCK: Irrigated corn, alfalfa, grains, sorghum, dry beans, vegetables, melons, onions, tomatoes, and watermelons.

OBJECTIVES: Reduce the amount of salts reaching the river, improve on-farm irrigated water management, reduce over application of nutrients and pesticides, provide Best Management Practices (BMPs) for pesticides, and approve cost share assistance.

IMPACTS:

- ◆ One variety of potato yielded 11,116 lbs/ac with surge and 10,745 lbs/ac with conventional irrigation while corn yielded 162 bu/ac with surge irrigation and 153 bu/ac with conventional irrigation. Salts were reduced 28% (6,791 to 4,875 lbs/ac) and 33% (3,988 to 2,663 lbs/ac) in applied water and 37% (717 to 455 lbs/ac) and 22% (704 to 549 lbs/ac) in runoff waters.
- ◆ Completed economic analysis on demonstration sites comparing conventional irrigation with surge irrigation. Conventional irrigation has an average per acre cost of \$3.68 less than surge irrigation. The average per acre returns to operator's labor and management was \$4.26 more for conventional irrigation than for surge irrigation.

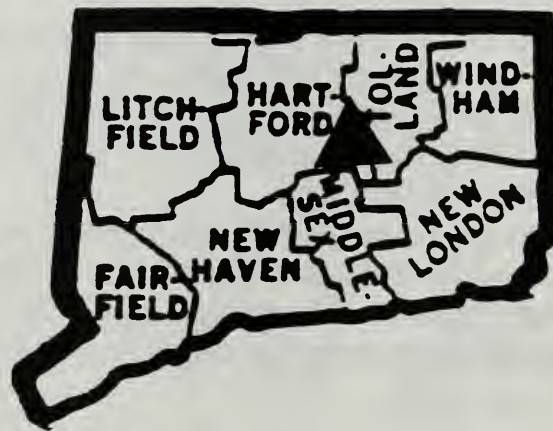
ACTIVITIES:

- ◆ Irrigators have installed over 29 miles of conveyance systems-gated pipe, concrete ditches, 15 irrigation control structures and 24 trash screens.
- ◆ Conducted tours, field days, and radio interviews to promote water quality.
- ◆ Prepared pamphlets, had one-on-one sessions and presentations.
- ◆ Prepared a surge irrigation demonstration on corn.
- ◆ Cost-sharing under annual conservation program and 64 long term agreements were utilized.
- ◆ One-on-one contacts with 472 landowners resulting in 33 follow ups by minorities and women.

OTHER AGENCIES: U.S. Geological Survey, USDA-Agricultural Research Service, Environmental Protection Agency, Colorado State Soil Conservation Board, and the Colorado Water Quality Control Board.

REPORTING & EVALUATION: Monitor and evaluate the soil-plant atmosphere continuum (SPAC), and economic monitoring and evaluation.

Connecticut



▲ **Housatonic River**

STATE: CONNECTICUT

PROJECT SIZE: 1,245,440 acres.

PROJECT NAME: HOUSATONIC RIVER

STARTED: 1990

COUNTIES IN PROJECT: LITCHFIELD, FAIRFIELD, NEW HAVEN, HARTFORD

CROPS/LIVESTOCK: Silage corn, hay, sorghum, barley, oats, rye, wheat, sunflowers, fruits, vegetables, vineyards, beef, sheep, horses, poultry and dairy.

OBJECTIVES: Reduce soil erosion, reduce loading of phosphorus and sediment to the recreational lakes, reduce/manage the inputs of pesticides and nitrogen to minimize risk of contamination of surface or groundwater, and reduce loading of nitrogen to Long Island Sound.

IMPACTS:

- ◆ Topdress fertilizer nitrogen (N) applications were reduced by an average of 50 lbs per acre in 1992.
- ◆ Process model suggests that implementing nutrient management practices can reduce loss of N to groundwater by 25 to 80%.

ACTIVITIES:

- ◆ Conducted integrated pest management and crop management training.
- ◆ Trained producers on the use of pre-sidedress soil nitrogen testing, and manure spreader and pesticide sprayer calibration.
- ◆ Conducted field corn herbicide demonstration.
- ◆ Implemented 6 long term agreements on animal waste management and 1 long term agreement on irrigation water management.
- ◆ Promoted conservation planning and cost share programs.

OTHER AGENCIES: Environmental Protection Agency, Connecticut Department of Environmental Protection, Connecticut Department of Health Services, and Connecticut Agricultural Experiment Station.

REPORTING & EVALUATION: Evaluate agricultural waste management systems. Use Erosion/Productivity Impact Calculator (EPIC) which is a computer model to evaluate the effectiveness of nutrient management practices.

Connecticut



● **Scantic River**

STATE: CONNECTICUT

PROJECT SIZE: 62,664 acres.

PROJECT NAME: SCANTIC RIVER

STARTED: 1991

COUNTIES IN PROJECT: HARTFORD, TOLLAND

CROPS/LIVESTOCK: Ornamentals, tobacco, vegetables, small fruits, orchards, corn, beef, hogs, sheep, horses, and dairy.

OBJECTIVES: Control of soil erosion and reduce nutrient and pesticide losses to surface and groundwater resources, and reduce in the loading of nutrients, sediments, and pesticides.

IMPACTS:

- ◆ Achieved 36% reduction in pounds of pesticide active ingredient (a.i.) used in 1992 on 4,315 acres with 24 growers.

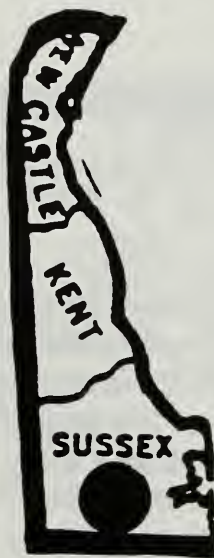
ACTIVITIES:

- ◆ Established an Integrated Pest Management (IPM) training program.
- ◆ Two on-farm demonstration plots were established to show the effects of reduced herbicide rates on weed control and yields of field corn.
- ◆ Created two traveling displays for use in the project.
- ◆ Purchased 12 "Proud To Be A Conservation Farmer" signs.
- ◆ Developed a color fact sheet on the history of the Scantic River.
- ◆ Redesigned and reprinted the interagency brochure.
- ◆ Distributed information packets to farmers in the watershed on the Food Security Act.
- ◆ A bus tour of projects and programs and overview of the Scantic River project and programs were provided for 50 agronomists attending the Northeast Agronomy Society annual meeting.

OTHER AGENCIES: Environmental Protection Agency, Connecticut Department of Environmental Protection, Connecticut State Department of Health Services, and Connecticut Agricultural Experiment Station.

REPORTING & EVALUATION: Evaluate agricultural waste management systems. Use Erosion Productivity Impact Calculator (EPIC) to evaluate effectiveness of nutrient management practices.

Delaware



● Inland Bays

STATE: DELAWARE
PROJECT NAME: INLAND BAYS
COUNTIES IN PROJECT: SUSSEX

PROJECT SIZE: 172,800 acres.
STARTED: 1990

CROPS/LIVESTOCK: Corn, soybeans, wheat, barley, and broiler type chickens.

OBJECTIVES: Reduce nonpoint source pollution from 300 farms in the Inland Bays' watersheds through nutrient management, poultry carcass composting, integrated pest management, water resource management and protection, farmstead management, education and research.

IMPACTS:

- ◆ Reduction of 104,000 lbs. of nitrogen (N) on 2,328 acres in 1991. Reduction of 432,000 lbs. of N estimated for the watershed in 1992 due to nutrient management.
- ◆ Nearly 50 percent of the cropland (30,000 acres) now has nutrient management plans.
- ◆ The we C.A.R.E. (Comprehensive Agricultural Resources Effort) water quality planning and implementation process started in the Inland Bays project is being adopted in other Delaware watersheds.
- ◆ Producers have reduced their manure applications by 3 tons per acre, saving 108 lbs. of N, 138 lbs. of phosphorus, (P_2O_5) and 72 lbs. of potassium (K_2O) per acre.
- ◆ 16 manure storage structures, 7 poultry carcass composting structures and 10 water control structures installed.

ACTIVITIES:

- ◆ Conducted tours, meetings, exhibits, and demonstrations to promote water quality.
- ◆ Prepared and distributed fact sheets, videos, newsletters, and public service announcements on water quality.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Surveyed cooperators to determine practices adopted.
- ◆ Analyzed 31 manure samples and calibrated 23 manure spreaders in 1992.
- ◆ Performed 87 pre-sidedress nitrogen tests for 17 producers on 2,000 acres in 1992.
- ◆ Nutrient management planning for 523 fields (25,867 acres).

OTHER AGENCIES: Sussex Conservation Districts, Delaware Department of Natural Resources and Environmental Control, Delaware Department of Agriculture and Forestry.

REPORTING & EVALUATION: Using nitrate Leaching and Economic Analysis Package (NLEAP) and Agricultural Non-Point Source Pollution (AGNPS); Both are computer models to be used for evaluations.

STATE: FLORIDA

PROJECT SIZE: 540,000 acres.

PROJECT NAME: MIDDLE SUWANNEE RIVER

STARTED: 1990

COUNTIES IN PROJECT: LAFAYETTE, SUWANNEE

CROPS/LIVESTOCK: Corn, soybeans, watermelons, peanuts, tobacco, dairy, and poultry.

OBJECTIVES: Protect surface and groundwater through effective waste-management practice; develop and demonstrate dairy and poultry waste composting, develop forage analysis program.

IMPACTS:

- ◆ Reduced phosphorus (P_2O_5) application on sweet corn by 12 lbs per acre per year on 8,615 acres.

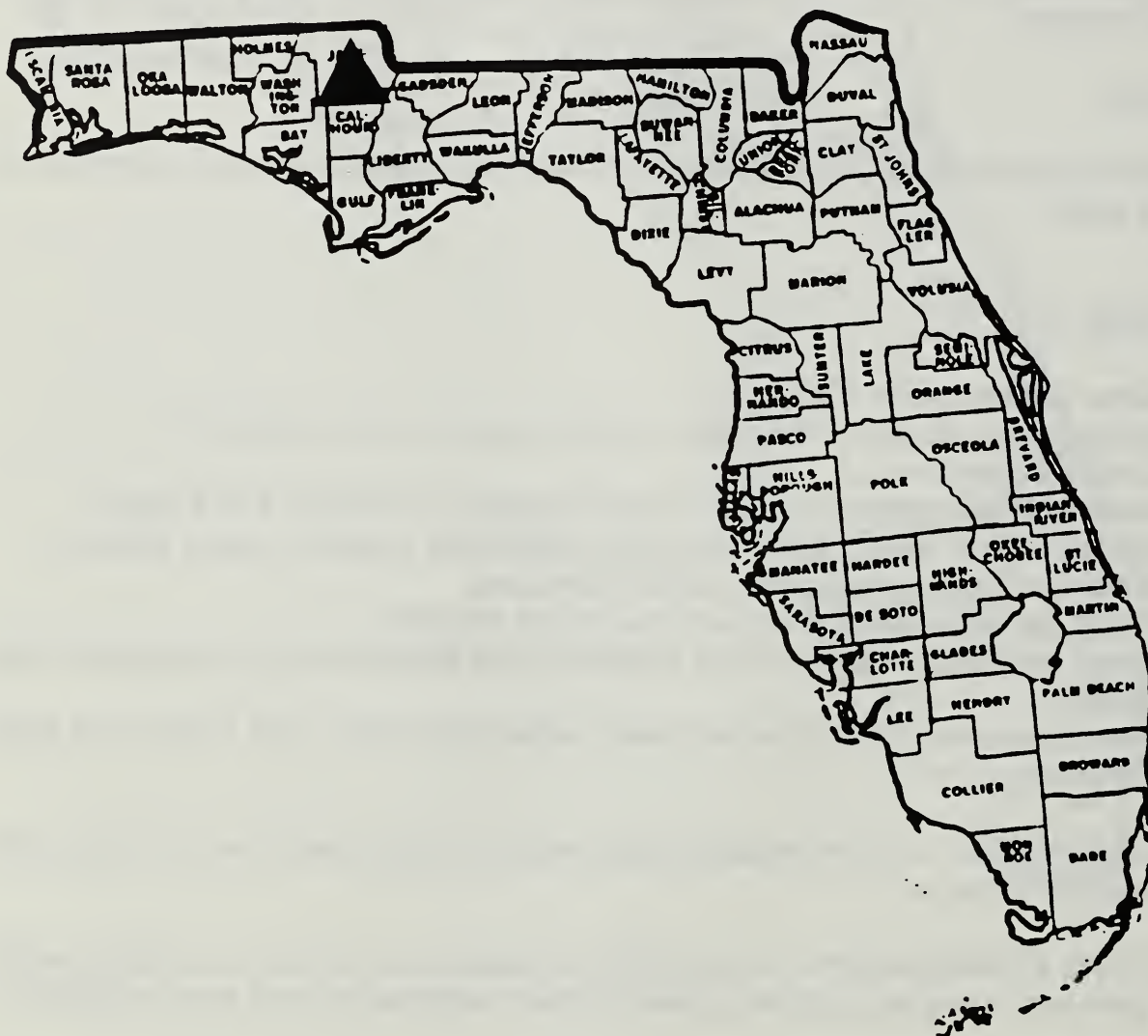
ACTIVITIES:

- ◆ Provided soil testing for producers.
- ◆ Conducted demonstrations on carrot and corn crops to show different P fertilization treatments.
- ◆ Established a laboratory to provide nutrient analysis of manures and forages.
- ◆ Developed animal waste composting as an alternative means to waste disposal.
- ◆ Implemented long term agreements with producers.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Published handbooks, news articles, factsheets and brochures on project goals in the watershed.
- ◆ Installed 40 water control structures, land levelled 5,000 acres, and 7,000 acres were mole drained.

OTHER AGENCIES: U.S. Geological Survey, and the Florida Department of Agriculture and Consumer Services.

REPORTING & EVALUATION: Survey will be established to monitor and analyze water quality data from sampling stations; survey farmers' attitudes on cost share programs.

Florida



▲ Karst Cropland

STATE: FLORIDA
PROJECT NAME: KARST CROPLAND
COUNTIES IN PROJECT: JACKSON

PROJECT SIZE: 313,000 acres.
STARTED: 1991

CROPS/LIVESTOCK: Peanuts, corn, small grains, soybeans.

OBJECTIVES: Reduce nutrient and pesticide impact in project area, develop conservation plans and groundwater monitoring programs, produce leaching, runoff and erosion maps.

IMPACTS:

- ◆ Estimated reduction in the quantity of pesticides applied as a result of conservation practices is 7 lbs of active ingredient per acre per year.

ACTIVITIES

- ◆ Conducted a peanut weed control demonstration.
- ◆ Established and developed a pesticide container recycling program.
- ◆ Implemented a geographic information and water quality modeling system.
- ◆ Constructed a chemical mixing and loading facility.
- ◆ Established demonstration plots for crop rotation and weed control.
- ◆ Utilized cost sharing under conservation reserve program and long term agreements.
- ◆ Conducted tours, meetings, surveys; wrote newsletters, articles to promote water quality.
- ◆ Constructed two animal waste facilities in 1992 - One for a dairy, milking 350 cows per day; the other for a swine facility that finishes 250 hogs per year.

OTHER AGENCIES: Environmental Protection Agency, Florida Department of Environmental Regulation, and Florida Department of Agriculture and Consumer Services.

REPORTING & EVALUATION: Monitoring wells, collect field data, and monitor groundwater.

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STATE: FLORIDA
PROJECT NAME: LAKE APOPKA
COUNTIES IN PROJECT: LAKE, ORANGE

PROJECT SIZE: 62,000 acres.
STARTED: 1991

CROPS/LIVESTOCK: Vegetables, sod, citrus, timber, pasture.

OBJECTIVES: Reduce levels of nitrogen and phosphorus discharged into Lake Apopka.

IMPACTS:

- ◆ Phosphorus (P_2O_5) application reduced (estimate) by one-third in 1992.
- ◆ Average phosphorus application on sweet corn was reduced by 12 pounds per acre on 8615 acres for a total of 103,380 lbs P_2O_5 .

ACTIVITIES:

- ◆ One hundred percent of targeted farms participate in project activities.
- ◆ Implemented practices such as land leveling, water table control, nutrient and pesticide management, and irrigation management which have resulted in reduced nutrient application.
- ◆ Installed low volume irrigation systems in citrus fields to reduce water use of leaching of nutrients.
- ◆ Established on-farm fertilizer demonstration sites with cooperators.
- ◆ Conducted tours, meetings, prepared newsletters to promote project goals.
- ◆ Promoted conservation planning and cost share programs.

OTHER AGENCIES: Lake Gem Farms.

REPORTING & EVALUATION: Tissue analysis used in monitoring; data collection; water table monitoring, evaluate field test kits.

Georgia



▲ Little River/Rooty Creek

STATE: GEORGIA

PROJECT SIZE: 219,950 acres.

PROJECT NAME: LITTLE RIVER/ROOTY CREEK **STARTED:** 1991

COUNTIES IN PROJECT: JASPER, MORGAN, NEWTON, PUTNAM, AND
WALTON

CROPS/LIVESTOCK: Corn, sorghum, soybeans, beef, turkeys and dairy.

OBJECTIVES: Improve streambank management livestock, poultry, cropland, pasture.

IMPACTS:

- ◆ Reduced annual soil loss and sediment yield by 6,071 tons on 1,554 acres of land.
- ◆ Contained and managed 20,970 tons of animal waste on the farms.

ACTIVITIES:

- ◆ Implemented long term agreement that reduced sediment on 1,047 acres of land.
- ◆ Promote watershed protection through news articles, fact sheets, tours, meetings, and nutrient demonstrations.
- ◆ Established an animal waste pumpout program.
- ◆ Constructed artificial wetlands to process waste.
- ◆ Developed a groundwater model to educate the public on pollution.
- ◆ Worked on wellhead protection.
- ◆ Approved long term agreements for treatment of nonpoint source pollution.
- ◆ Established best management practices such as: constructed - waste storage structures - water retention structures - waste lagoons

OTHER AGENCIES: Environmental Protection Agency, U.S. Geological Survey, Georgia Power Company, Georgia Dairy Association, and Georgia Farm Bureau.

REPORTING & EVALUATION: Water chemistry sampling, and flow data collection, conservation reporting and evaluation system will be used to monitor progress, and evaluate artificial wetlands. Lagoon and domestic well testing is being conducted.

Hawaii



▲ **Kaiaka — Waialua**

STATE: HAWAII
PROJECT NAME: KAIKA-WAIALUA
COUNTIES IN PROJECT: HONOLULU

PROJECT SIZE: 70,700 acres.
STARTED: 1991

CROPS/LIVESTOCK: Sugar cane and pineapples.

OBJECTIVES: Reduce agricultural chemical pollution, control sediment sources; implement effective education and public involvement.

IMPACTS:

- ◆ Increased public awareness of non-point source pollution problems within the project.
- ◆ Cooperatively developed a Comprehensive Resource Management Plan.
- ◆ Study the use of natural and artificial wetlands to further mitigate the effects of sediment on bay ecology and turbidity (high-priority water quality issue for residents of Kaiaka-Waialua Bay project).

ACTIVITIES:

- ◆ Participated in annual Earth Day Fair
- ◆ Sponsored conservation awareness and field tour.
- ◆ Developed brochures, pamphlets, mailing list, bulletins, and newsletters to promote the project goals.
- ◆ Developed a water quality display with estimated viewership of 18,000 people.
- ◆ Produced a slide show of the project.
- ◆ Held an event to promote the "protection of drinking water."
- ◆ Held a "Household Hazardous Waste Training Program" for 23 Extension Homemakers.
- ◆ Utilized conservation planning and cost share programs.
- ◆ Applied erosion and sediment control practices such as contour farming, filter strip, chiseling and subsoiling.
- ◆ Installed erosion/sediment control practices for 20 producers on 15,600 acres of land.

OTHER AGENCIES: Environmental Protection Agency, Honolulu Department of Health, U.S. Geological Survey, and Honolulu Board of Water Supply.

REPORTING & EVALUATION: Chemical and water monitoring, and on-site evaluations.

Idaho



▲ Snake — Payette

STATE: IDAHO

PROJECT SIZE: 848,208 acres.

PROJECT NAME: SNAKE-PAYETTE

STARTED: 1991

COUNTIES IN PROJECT: ADAMS, CANYON, GEM, PAYETTE, WASHINGTON

CROPS/LIVESTOCK: Alfalfa, barley, dry beans, corn, hops, oats, onions, peppermint, potatoes, seed crops, spearmint, sugarbeets, wheat, beef, dairy, sheep and horses.

OBJECTIVES: Reduce pollution from pesticides and nutrients; improve nutrient and pesticide management of crops, develop Best Management Practices (BMPs).

IMPACTS:

- ◆ Increased public awareness of nonpoint source pollution within the project.
- ◆ Assisted 16 farmers with conservation plans and Agriculture Conservation Practice (ACP) funds covering 1,981 acres of cropland.
- ◆ All farm plans included irrigation, nutrient and pesticide specifications designed to protect water quality.
- ◆ Waste management plans developed for two producers.
- ◆ Implemented nine Water Quality Incentive Program contracts covering 1,130 acres.

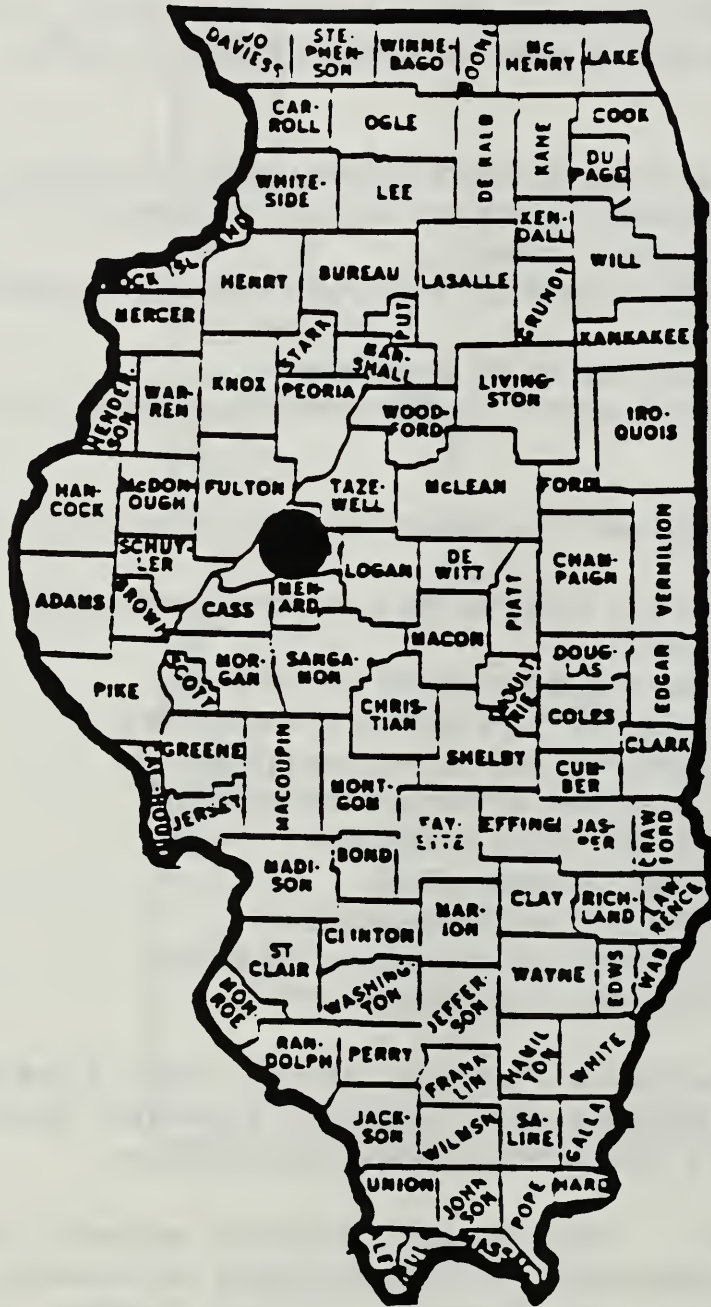
ACTIVITIES:

- ◆ Completed a comprehensive grower management survey covering 13,000 acres of irrigated cropland.
- ◆ A groundwater monitoring plan was implemented to establish water quality trends and increase baseline data.
- ◆ News releases were used to achieve a high profile for the project.
- ◆ Published brochures, newsletters and fact sheets to promote BMPs.
- ◆ Assisted Soil and Water Conservation Districts with field tours.
- ◆ Developed and distributed a worksheet for nitrogen management.
- ◆ Produced slide sets to promote the project and BMPs.
- ◆ Assisted several inter-agency field research efforts.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Over 25 agri-businesses are involved with activities in the project.
- ◆ Conducted five field demonstrations in 1992 and six in 1993.

OTHER AGENCIES: Environmental Protection Agency, Idaho Department of Environmental Quality, Health Service Division, Agricultural Experiment Station, Idaho Department of Agriculture, Idaho Farm Bureau, Bureau of Reclamation.

REPORTING & EVALUATION: Well sampling; economic evaluation of BMPs; cooperator tracking of BMPs implemented. The following models will be used to evaluate management Nitrate Leaching and Economic Analysis Package (NLEAP). Erosion/Productivity Impact Calculator (EPIC), National Pesticide/Soils database and Use decision support system for risk assessment of ground and surface water contamination (NPURG).

Illinois



● Illinois River Sands

STATE: ILLINOIS
PROJECT NAME: ILLINOIS RIVER SANDS
COUNTIES IN PROJECT: MASON

PROJECT SIZE: 250,000 acres.
STARTED: 1990

CROPS/LIVESTOCK: Corn, soybeans, cucumbers, potatoes, tomatoes, and melons.

OBJECTIVES: Reduce nitrates and pesticides subject to transport through leaching; reduce wind erosion.

IMPACTS:

- ◆ Reduced an average of 298 pounds of nitrogen (N) per acre per year.
- ◆ Reduced an average of 92 pounds of phosphorus (P_2O_5) per acre per year.
- ◆ Used oil collection day was held where over 7,200 gallons of used oil was collected for recycling.

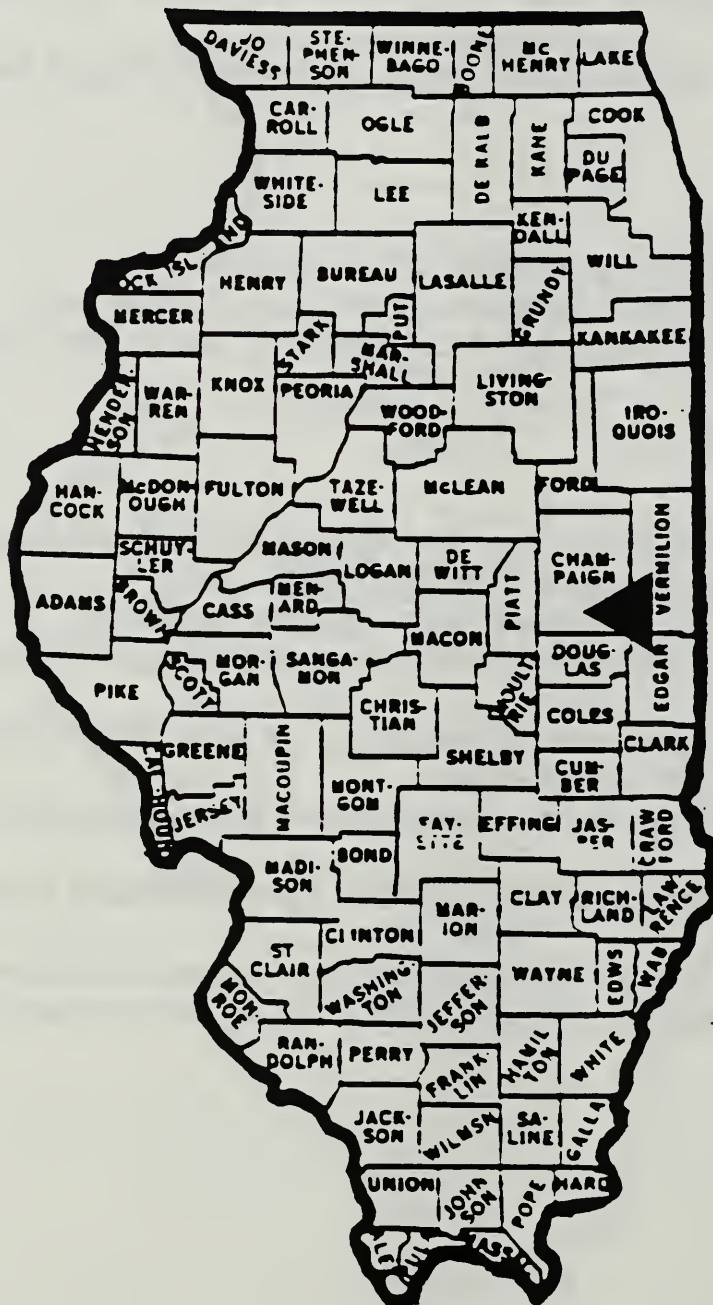
ACTIVITIES:

- ◆ Secured a wellhead protection survey to meet the needs of Mason county residents.
- ◆ Published newsletters and news releases to promote water quality.
- ◆ A wellhead survey of the Havana and Quiver townships was conducted.
- ◆ Information on irrigation water management and irrigation scheduling continues to be distributed via tours.
- ◆ Installed check valves on irrigation systems thus having the potential to reduce or prevent back-flow of agrichemical into the aquifer.
- ◆ Groundwater field day was held to showcase major causes of groundwater pollution.

OTHER AGENCIES: Illinois Geological Survey, and U.S. Fish and Wildlife Service.

REPORTING & EVALUATION: The microcomputer irrigation schedule program will be used to help farmers schedule irrigation; computer models will be used to track the fate of pesticides and nutrients.

Illinois



▲ Little Vermilion

STATE: ILLINOIS

PROJECT SIZE: 122,240 acres.

PROJECT NAME: LITTLE VERMILION

STARTED: 1991

COUNTIES IN PROJECT: CHAMPAIGN, EDGAR, VERMILION

CROPS/LIVESTOCK: Corn, soybeans, pasture, hay and small grains.

OBJECTIVES: Reduce contamination of surface water; improve aquatic fish and wildlife habitat, reduce impacts of nutrients and pesticides.

IMPACTS:

- ◆ Reduced nitrogen (N) application for surface water by 15 pounds per acre per year.
- ◆ Reduced atrazine (herbicide) application by 1 pound of active ingredient (a.i.) and trifluralin (pesticide) by .75 pound of a.i.

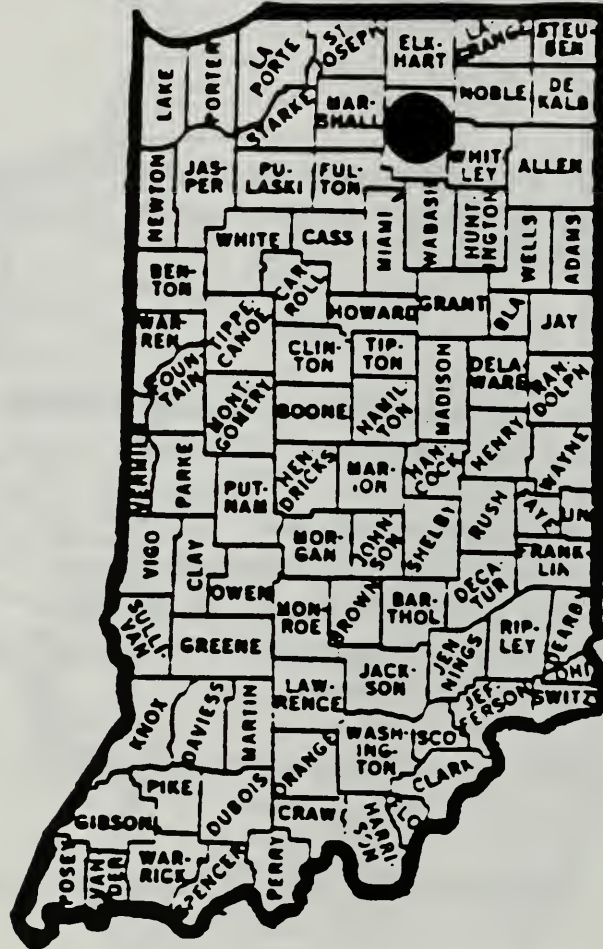
ACTIVITIES:

- ◆ Landowners and farm operators in the watershed have been informed of project activities through the use of direct mail, newsletters, and tours.
- ◆ Held tour on sealing of abandoned wells.
- ◆ Held information campaign for crop reserve program.
- ◆ Developed brochures and fact sheets to promote water quality.
- ◆ Integrated crop management plans have been applied on 18 farms
- ◆ Completed practices to reduce erosion and sediment such as no-till, residues sediment management, and grassed water ways.

OTHER AGENCIES: Illinois Geological Survey, Environmental Protection Agency, Illinois Department of Conservation.

REPORTING & EVALUATION: Recordkeeping, data collection; sample private wells, monitor well water quality.

Indiana



● Upper Tippecanoe

STATE: INDIANA

PROJECT SIZE: 209,000 acres.

PROJECT NAME: UPPER TIPPECANOE

STARTED: 1990

COUNTIES IN PROJECT: KOSCIUSKO, WHITLEY, NOBLE

CROPS/LIVESTOCK: Corn, soybeans, wheat, hay, poultry, hogs, dairy, and beef cattle.

OBJECTIVES: Reduce pesticide and nitrate loading to ground water resources; reduce phosphorous loading and sedimentation of surface waters.

IMPACTS:

- ◆ Assisted 8 producers to improve manure storage and handling practices. This has resulted in a total increase in nutrient equivalents managed to 100 tons of nitrogen and 65 tons of phosphorus.
- ◆ Installed erosion control practices resulting in 43,000 tons of soil saved and 430 pounds of soluble phosphorus prevented from entering surface waters.
- ◆ Applied Integrated Crop Management (ICM) on 3,000 acres. Nutrient and pesticide application on these acres are within Extension recommendations.

ACTIVITIES

- ◆ Published newsletters, brochures, factsheets to promote water quality.
- ◆ Promoted a program to compare the economic performance of conservation tillage with other tillage types.
- ◆ Certified 143 pesticide applicators in 1991-1992.
- ◆ Initiated low cost water testing for private well owners/surface water sampling at Best Management Practice (BMP) sites.
- ◆ Farm*A*Syst practice for assessing farmstead pollution potential is in use.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Conducted nutrient management workshops and provided one-on-one assistance with developing nutrient management plans.
- ◆ Held hazardous pesticide disposal days.
- ◆ Implemented long term agreements with producers.

OTHER AGENCIES: County Health Departments, Indiana Department of Environmental Management.

REPORTING & EVALUATION: Private well sampling for nitrates, use of simulation models: Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), Erosion Productivity Impact Calculator (EPIC) and Agricultural Nonpoint Source Pollution Model (AGNPS) for surface water sampling for sediment and phosphorus; Farm*A*Syst used for potential groundwater contamination.

STATE: INDIANA

PROJECT NAME: TRI-COUNTY

COUNTIES IN PROJECT: LA PORTE, MARSHALL, ST. JOSEPH

PROJECT SIZE: 249,000 acres.

STARTED: 1991

CROPS/LIVESTOCK: Corn, soybeans, hay, wheat, turf, blueberries, onions, mint, cabbage, cucumbers, tomatoes, hogs, and dairy.

OBJECTIVES: Reduce nitrates and pesticides in surface and ground water; reduce phosphates and sediment loading in surface waters.

IMPACTS:

- ◆ Integrated Pest Management (IPM) demonstration on field crops showed the importance of scouting and timing of pesticide application as a key to lowering input costs and optimizing crop yield.
- ◆ Applied integrated crop management on 6,644 acres.
- ◆ Assisted 5 livestock producers to adopt improved manure application on 1,424 acres.
- ◆ Increased grower awareness of reducing the impact of nonpoint source pollution.

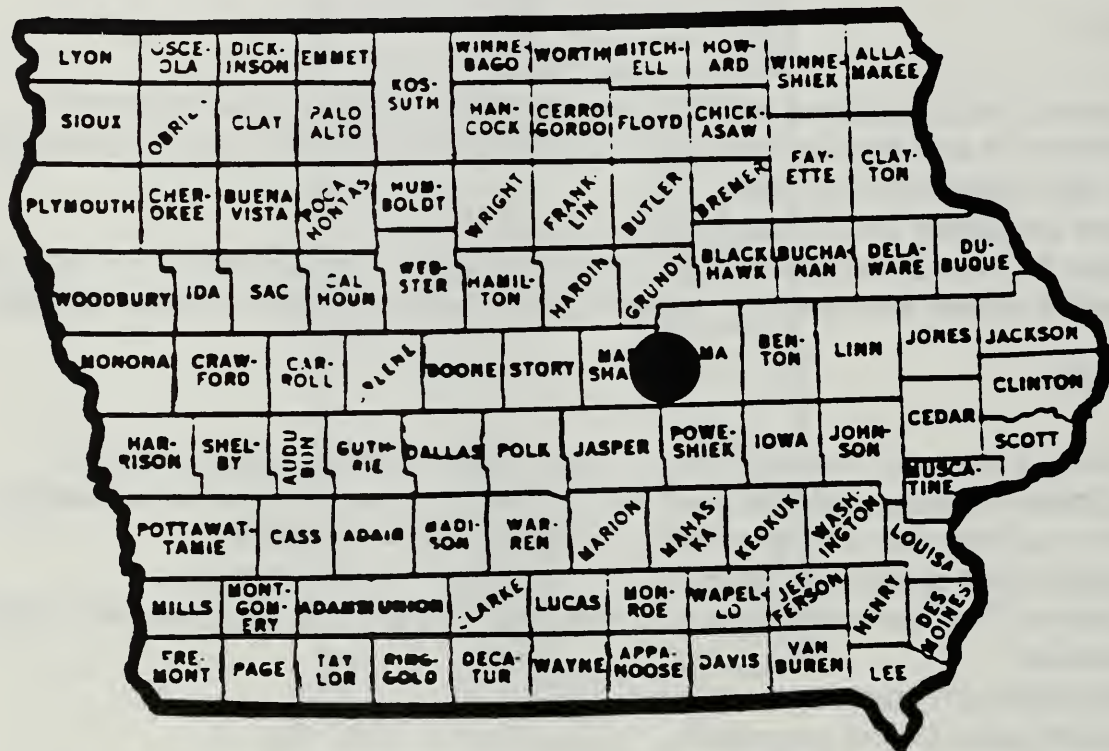
ACTIVITIES:

- ◆ Published brochures, newsletters and fact sheets to promote water quality.
- ◆ Conducted meetings, field days, demonstrations, surveys, one-on-one sessions.
- ◆ On-farm testing of ammonia-nitrogen in manure was conducted.
- ◆ Developed and distributed worksheets to calibrate manure spreader.
- ◆ Established IPM demonstrations to teach crop scouting and evaluate pest control alternatives.
- ◆ Implemented long term agreements.
- ◆ Held well water testing programs.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Fourteen percent of corn and soybean fields applied no-till planting methods.
- ◆ Nutrient management workshops and one-on-one planning.

OTHER AGENCIES: County Health Departments, Indiana Department of Environmental Management.

REPORTING & EVALUATION: Collect land treatment data; private well testing; the following computer models will be used to evaluate the impact of implementation: Agricultural Non-Point Source (AGNPS), Erosion Productivity Impact Calculator (EPIC), and Groundwater Loading Effects of Agricultural Management Systems (GLEAMS).

Iowa



● Union Grove/Black Hawk

STATE: IOWA

PROJECT SIZE: 13,300 acres.

PROJECT NAME: UNION GROVE & BLACK HAWK **STARTED:** 1990

COUNTIES IN PROJECT: TAMA, MARSHALL (UNION GROVE LAKE); SAC & CARROLL (BLACK HAWK LAKE)

CROPS/LIVESTOCK: Corn, potatoes, soybeans, alfalfa, oats, feeder cattle, and hogs.

OBJECTIVES: Voluntary adoption of refined crop and manure management to reduce sediment and animal waste delivery; improved protection of private water wells.

IMPACTS:

- ◆ Union Grove Lake: 60 producers have installed practices to control erosion and sediment on a total of 6,000 acres. Ninety-five percent of watershed cropland is treated to T (Control goal).
- ◆ Union Grove Lake: 17 operators have installed practices to further reduce sediment runoff from 1,300 acres.
- ◆ Union Grove Lake: Average residue cover after planting increased from 33% to over 55%. Nitrogen (N) application was reduced in 1992 an average of 8 lbs per acre on corn fields, or 24,000 lbs and phosphorus (P_2O_5) application was reduced an average of 10 lbs per acre on corn fields, or 30,000 lbs total.
- ◆ Black Hawk Lake: 62 producers have installed erosion control practices on a total of 5,059 acres.
- ◆ Black Hawk Lake-N application was reduced 26,220 lbs in 1991 and 14,913 lbs in 1992. P_2O_5 application was reduced 51,720 lbs in 1991 and 72,915 lbs in 1992. Overall herbicide and insecticide use was reduced in 1992 by an average of 0.4 lb. a.i./acre, for a reduction of over 2,000 lbs a.i. (a.i. = active ingredient).

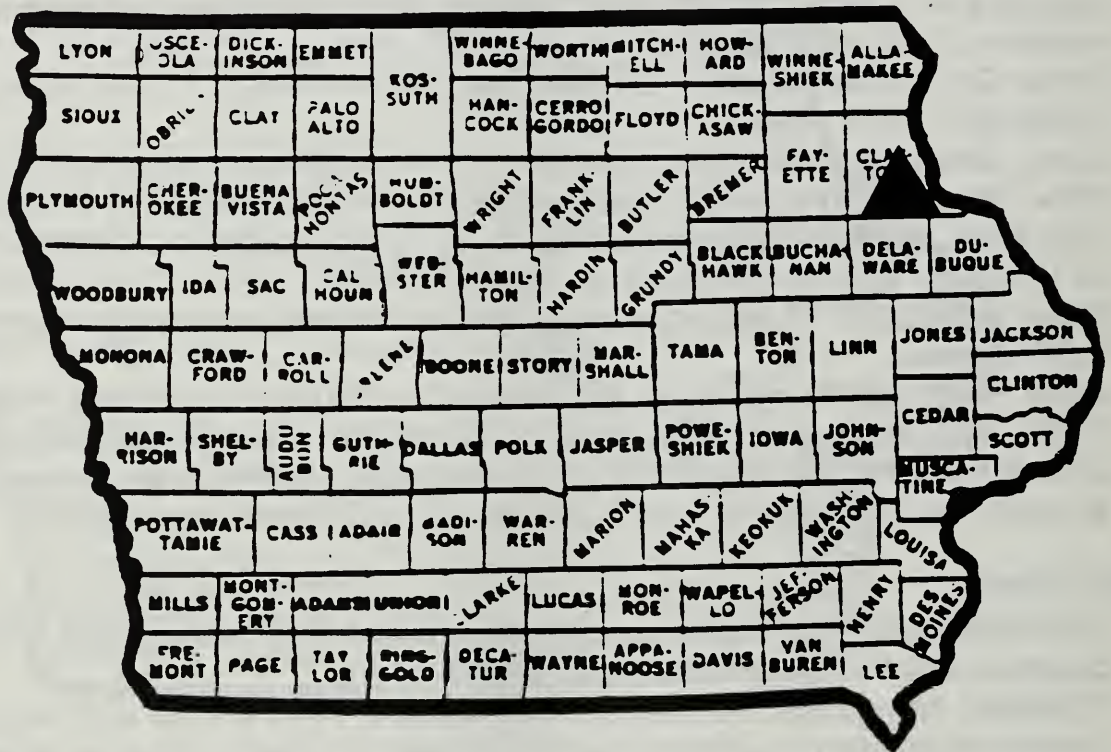
ACTIVITIES:

- ◆ Conducted meetings, tours, field days and on-farm demonstrations to promote practices which improve and protect water quality.
- ◆ Published newsletters, brochures, news releases, news articles and reports; present information to schools, civic groups and on radio to promote project goals.
- ◆ Provided individualized integrated crop management (ICM) assistance to 33 farm operators on over 13,526 crop and pasture acres for soil testing and nutrient management planning, regular scouting and pest management planning, crop enterprise recordkeeping.

OTHER AGENCIES: Iowa Department of Natural Resources, Environmental Protection Agency, Iowa Department of Agriculture, and Land Stewardship.

REPORTING & EVALUATION: Lake water monitoring for phosphorus, turbidity, chlorophyll, fecal coliforms and temperature; surveys of farmer practices and attitudes toward water quality concerns.

Iowa



▲ Sny Magill

STATE: IOWA
PROJECT NAME: SNY MAGILL
COUNTIES IN PROJECT: CLAYTON

PROJECT SIZE: 22,780 acres.
STARTED: 1991

CROPS/LIVESTOCK: Corn, oats, and alfalfa, soybeans, pasture.

OBJECTIVES: Voluntary adoption of improved crop and manure management to reduce sediment and animal waste delivery to a coldwater stream; improved protection of private water wells.

IMPACTS:

- ◆ Seventy-nine of 98 watershed landowners are participating in the project.
- ◆ Project Agricultural Conservation Program (ACP) cost share funds were approved for 21 landowners in 1991, and 29 in 1992. Forty-two producers have installed practices to control erosion and reduce sediment delivery from 1,365 acres. Seventy percent of watershed cropland is planned to T (control goal).
- ◆ In 1992, 9 farm operators received the first year of direct assistance with integrated crop management planning on 3,572 crop and pasture acres. Nitrogen (N) application was reduced on 3 farms' first-year corn by an average of 46 lbs per acre, total reduction of 3,588 lbs. of N.
- ◆ Changing to no-till on 12 acres saved one producer \$13.00 per acre in 1992.

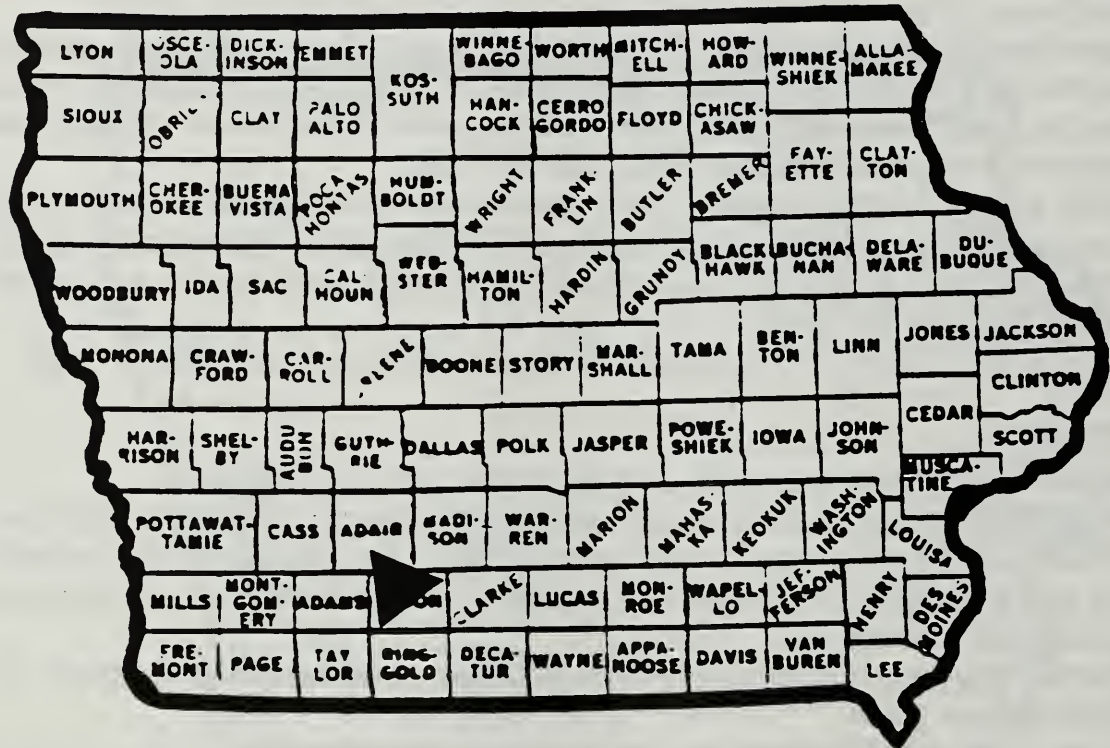
ACTIVITIES:

- ◆ One-on-one contacts were made with 98 landowners and operators.
- ◆ Conducted meetings, tours, field days and on-farm demonstrations to promote practices which improve and protect water quality. Targeted practices include tillage and crop nutrient management, manure management, pasture management and rotational grazing.
- ◆ Published newsletters, brochures, news releases, news articles and reports to promote project goals.
- ◆ Provided individualized integrated crop management assistance to farm operators crop and pasture acres for soil testing and nutrient management planning, regular scouting and pest management planning, crop enterprise record keeping.
- ◆ Promoted conservation planning and animal manure utilization through the use of cost share and incentive programs.
- ◆ Practices include crop rotation, conservation tillage, contouring, residue management, strip cropping and terraces.

OTHER AGENCIES: Iowa Department of Natural Resources, Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Geological Survey.

REPORTING & EVALUATION: Monthly and quarterly reports to all cooperating agencies, crop enterprise records kept, survey of farmer practices, conducting long term intensive monitoring project.

Iowa



▲ **Three Mile Creek**

STATE: IOWA
PROJECT NAME: THREE MILE CREEK
COUNTIES IN PROJECT: ADAIR, UNION

PROJECT SIZE: 23,300 acres.
STARTED: 1991

CROPS/LIVESTOCK: Corn, soybeans, pasture, and beef cattle.

OBJECTIVES: Voluntary adoption of refined crop and manure management and other best management practices to control erosion, sediment runoff, and animal waste delivery to the planned Three Mile Lake.

IMPACTS:

- ◆ A total of 6,720 lbs Nitrogen (N) was saved (not applied) by use of the late spring soil nitrate test. Over 400 lbs a.i. (active ingredients) of various insecticides were not applied due to scouting and use of economic thresholds for recommendations.
- ◆ A total of 90 producers have installed practices to control erosion and reduce sediment delivery from 6,500 acres.
- ◆ Three of 5 feedlots impacting the watershed have animal waste storage structures and management systems planned by the project.
- ◆ A livestock watering pond and controlled grazing system demonstration developed in the project is effectively promoting this technology locally.
- ◆ Sixty-five of 131 farm operators in the watershed are participating in the project.

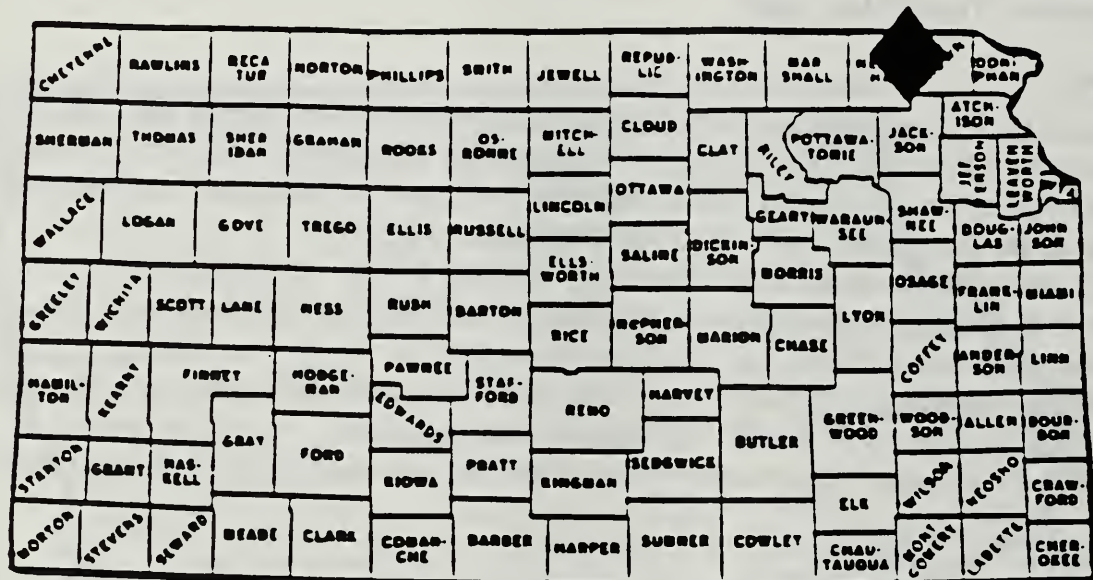
ACTIVITIES:

- ◆ One-on-one contacts made with 131 watershed landowners and operators.
- ◆ Conducted meetings, tours, field days and on-farm demonstrations to promote practices which improve and protect water quality.
- ◆ Provided individualized integrated crop management assistance and nutrient management planning, regular scouting and pest management planning, crop enterprise record keeping.
- ◆ Promoted conservation planning and waste utilization through the use of incentive and cost share programs.

OTHER AGENCIES: Iowa Department of Agriculture and Land Stewardship, Iowa Department of Natural Resources, Environmental Protection Agency, Three Mile Reservoir Agency.

REPORTING & EVALUATION: Monthly and quarterly reports to all cooperating agencies; crop enterprise records kept by integrated crop management program cooperators; sociological surveys of farmer practices and attitudes toward water quality concerns; determination of leaching potential of soils and chemicals used; long term intensive monitoring project sponsored by Environmental Protection Agency, demonstration and a watershed water quality planning tool (models) evaluation.

Kansas



◆ Webster Creek

STATE: KANSAS
PROJECT NAME: WEBSTER CREEK
COUNTIES IN PROJECT: BROWN, NEMAHA

PROJECT SIZE: 7,040 acres.
STARTED: 1991

CROPS/LIVESTOCK: milo, wheat, soybeans, corn, alfalfa, and red clover.

OBJECTIVES: Reduce suspended solids and phosphorus; reduce nitrates, fecal bacteria, pesticides, and organic waste.

IMPACTS:

- ◆ Developed nutrient management plans for producers which resulted in reducing nitrogen (N) fertilization by 30 lbs per acre.
- ◆ Soil test can result in a reduction of 5 lbs of phosphorus (P_2O_5) per acre.
- ◆ Reduced N loss from edge of field by 4.5% on 740 acres.
- ◆ Reduced P_2O_5 loss from edge of field by 29% on 912 acres.

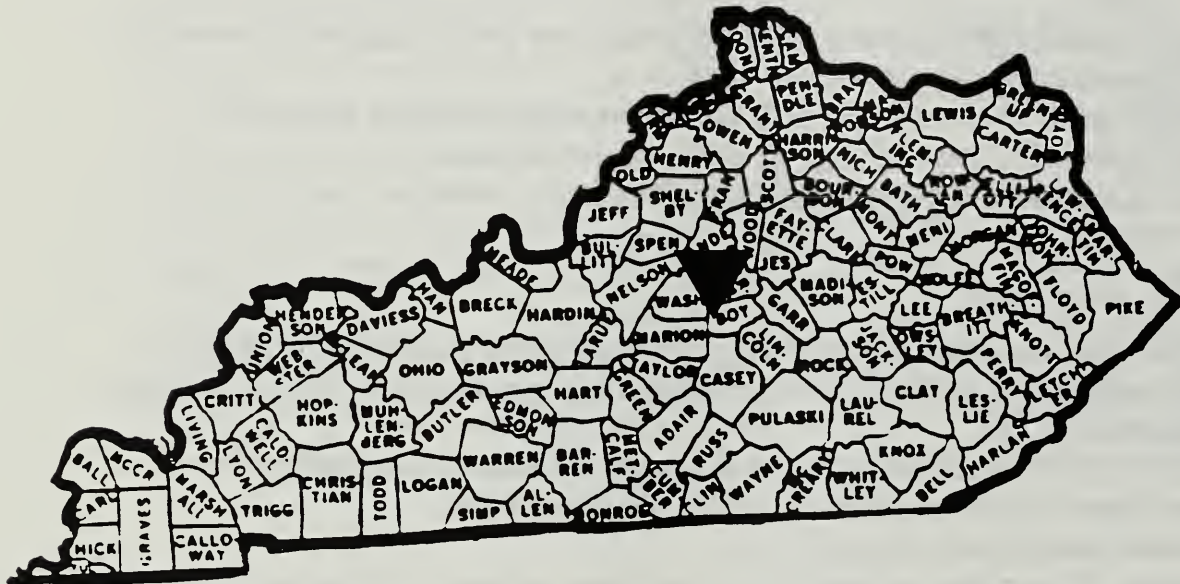
ACTIVITIES:

- ◆ Held public meetings, field days, tours, demonstrations; published newsletters, newspaper articles, to promote water quality goals and pollution control practices in the watershed.
- ◆ Adapted and pilot tested Farmstead Assessment System (Farm*A*Syst).
- ◆ Developed water quality monitoring and assessment plans.
- ◆ Implemented abandoned well plugging.
- ◆ Implemented 13 long term agreements to include sediment, nutrient and pest management on 1,200 acres. Two livestock waste management systems have been designed.

OTHER AGENCIES: Kansas Department of Health and Environment, Nemaha County and Brown County Conservation Districts.

REPORTING & EVALUATION: Water sampling; watershed monitoring and soil monitoring of nitrate-nitrogen, phosphate, fecal coliform bacteria, atrazine, alachlor anticipated; Agricultural Nonpoint Source (AGNPS) model will be used to evaluate pollution control practices.

Kentucky



▲ **Taylorville Lake**

STATE: KENTUCKY

PROJECT SIZE: 224,214 acres.

PROJECT NAME: TAYLORSVILLE LAKE

STARTED: 1991

COUNTIES IN PROJECT: ANDERSON, BOYLE, MERCER, NELSON, SHELBY,

CROPS/LIVESTOCK: Corn, wheat, soybeans, tobacco, dairy, and beef cattle.

OBJECTIVES: Reduce sediment organic materials, bacteria, pesticide residues, soil erosion, and nutrient loading. Inform and educate landusers and the public in the watershed of problems associated with nonpoint source pollution.

IMPACTS:

- ◆ Soil tests evaluated increased from 547 in 1991 to 749 in 1992. Mass media reports increased from 21 in 1991 to 62 in 1992 to increase public awareness of nonpoint source pollution and increase farmer participation in cost-sharing BMP work.
- ◆ Savings to the farmer: 66,825 lbs. Nitrogen (N) = \$19,038; 81,000 lbs. P_2O_5 = \$17,820; 164,025 lbs. K_2O = \$21,323; \$58,181 net savings in fertilizer costs to the watershed farmers using plans for animal waste management.

ACTIVITIES:

- ◆ Constructed animal waste facility with a wet cell component for waste water treatment.
- ◆ Developed newsletters and newspaper articles; conducted tours, field days, well testing, soil testing to promote project goals.
- ◆ Promoted cost share programs and conservation planning.
- ◆ Developed water quality display for use in meetings and conferences to promote water quality in the watershed.
- ◆ Established volunteer monitoring groups.
- ◆ Encouraged farmers to install animal waste facilities for dairy, swine and beef cattle to reduce nutrient loading.
- ◆ Encouraged farmers to install grassed waterways, establish pasture and hayland seedings and develop streambank protection to reduce soil erosion.
- ◆ Applications for animal waste facilities increased from 16 in 1991 to 35 in 1992.

OTHER AGENCIES: Corps of Engineers, Kentucky Department of Fish & Wildlife, Kentucky Division of Water and Conservation.

REPORTING & EVALUATION: Water monitoring; baseline data collected; loading of sediment and nutrients; evaluate fish population; evaluate and monitor Best Management Practices; develop models,

Louisiana



● Bayou Queue de Tortue

STATE: LOUISIANA

PROJECT SITE: 195,000 acres.

PROJECT NAME: BAYOU QUEUE DE TORTUE

STARTED: 1990

COUNTIES IN PROJECT: ACADIA, VERMILION, LAFAYETTE

CROPS/LIVESTOCK: Irrigated rice, soybeans, and crawfish.

OBJECTIVES: Reduce sediment discharges from rice fields.

IMPACTS:

- ◆ Grower participation has steadily increased from 8,589 acres in 1991, to 19,333 acres in 1992, to 36,170 acres in 1993.
- ◆ Four practices/options for rice water management were developed to target water quality improvement. Preliminary research has indicated that these options could help reduce salts in irrigation discharge water. Further investigation on the four management options will be conducted in 1993 in the area of discharge water quality, yield, and varietal effects.

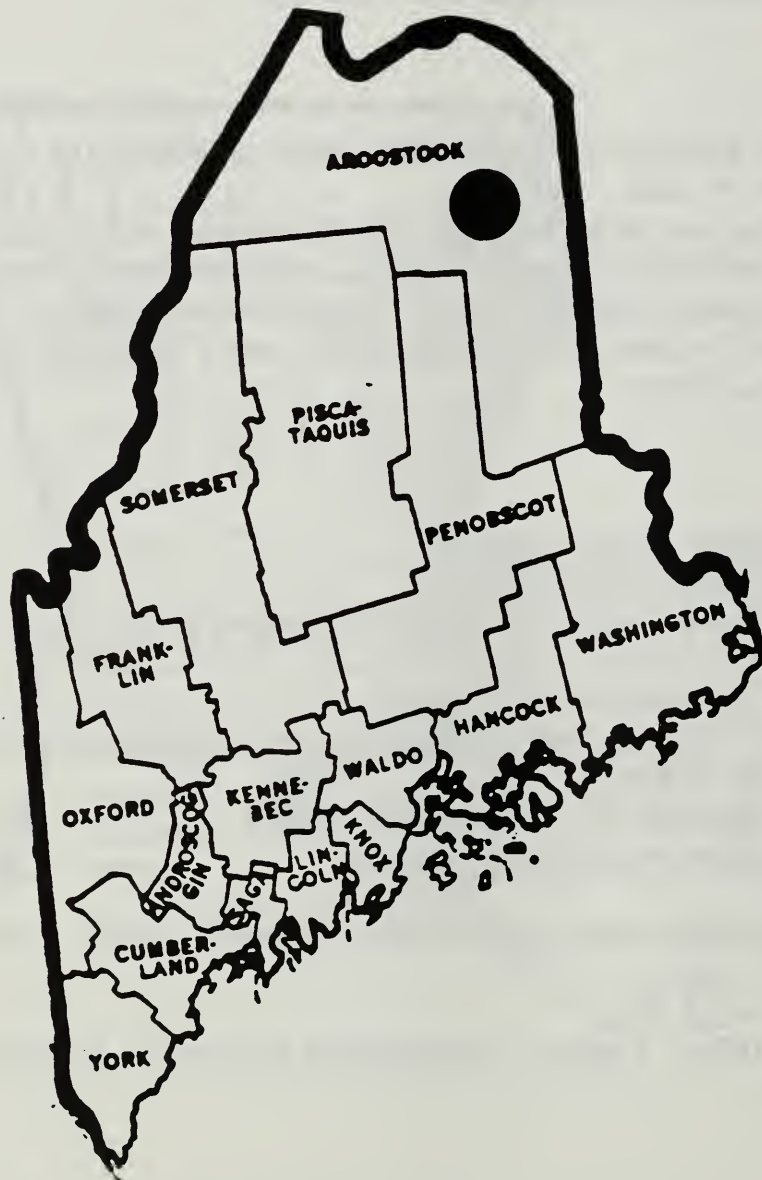
ACTIVITIES:

- ◆ Rice field days were used to develop interest.
- ◆ Conducted radio and television programs.
- ◆ Published newsletters, brochures and factsheets to promote project goals.
- ◆ Held 18 meetings with 635 farmers.
- ◆ Held 4 rice production tours with 585 participants.
- ◆ One-hundred and seventy-five producers installed erosion and sediment control practices on 10,669 acres of land in 1991.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Implemented long term agreements with producers.

OTHER AGENCIES: Louisiana Department of Environmental Quality, and the U.S. Geological Survey.

REPORTING & EVALUATION: Prepare a Geographic Information System (GIS) to develop a sampling plan.

Maine



● Long/Cross Lakes

STATE: MAINE
PROJECT NAME: LONG/CROSS LAKES
COUNTIES IN PROJECT: AROOSTOOK

PROJECT SIZE: 96,808 acres.
STARTED: 1990

CROPS/LIVESTOCK: Potatoes, oats, and beef cattle.

OBJECTIVES: Reduce total phosphorus loads, reduce silt loads; restore tributary streams, encourage adoption of integrated pest management practices to minimize the use of unnecessary pesticide applications, and maintain rural private water supplies while maintaining farm viability.

IMPACTS:

- ◆ Nutrient management plan adopted by 5 growers in 1991 resulted in a savings of 8,000 pounds of nitrogen (N) over a total of 800 acres.
- ◆ 2 growers saved 4000 lbs of phosphorus (P_2O_5) over 400 acres.
- ◆ Change from potato cropland to grassland represented a reduction of 2.25 lbs/ac/yr (over 302 acres) in total P load.
- ◆ 2,400 lbs of N was saved over 140 acres with a producer.
- ◆ 16 growers (estimated) saved two applications of fungicide in 1991 for an estimated savings of 12,000 lbs over 3000 acres
- ◆ Reduced total P load to Long Lake, an estimated 0.4 - 2.1%.
- ◆ Eight producers reduced the amount of N, P, and K applied at planting by 15.2 tons of each element over 1210 acres.
- ◆ Reduced N application an average of 2.7 pounds per acre per year.
- ◆ Reduced P_2O_5 application an average of 3.6 pounds per acre per year.

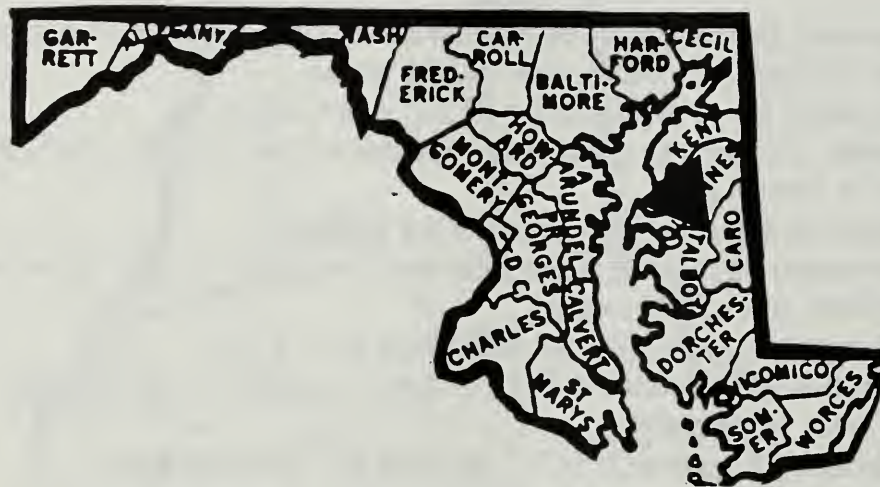
ACTIVITIES:

- ◆ Conducted tests on 17 septic drain fields in 1990.
- ◆ Conducted roadside runoff and erosion control workshops.
- ◆ Conducted meetings, tours, to promote irrigation, pesticide, and nutrient management.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Published newsletters and made one-on-one contacts to promote project goals.
- ◆ Implemented long term agreements with producers.

OTHER AGENCIES: Maine Department of Environmental Protection, Maine Department of Inland Fisheries and Wildlife, USDA-Agricultural Research Service.

REPORTING & EVALUATION: Monitoring of P by sampling on Dickey Brook; watershed survey to locate P sources; inventory of agricultural land; monitoring of household water supplies.

Maryland



▲ German Branch

STATE: MARYLAND
PROJECT NAME: GERMAN BRANCH
COUNTIES IN PROJECT: QUEEN ANNE'S

PROJECT SIZE: 12,000 acres..
STARTED: 1991

CROPS/LIVESTOCK: Corn, wheat, soybeans, barley, alfalfa, vegetables.

OBJECTIVES: Reduce nitrate and phosphorus levels; improve wildlife and fish habitat, emphasize integrated crop management.

IMPACTS:

- ◆ Installed agronomic and engineering practices which resulted in 11,000 tons of reduced soil erosion on 4,900 acres.
- ◆ Successful nutrient management program resulted in reduced application of over 116,000 pounds of nitrogen (N), 70,000 pounds potassium (K_2O), and 70,000 lbs of phosphorus (P_2O_5).
- ◆ Use of improved nutrient and pest management techniques resulted in a saving of \$278,000 in 1991-92.
- ◆ Reduced N application by 28 lbs/ac/yr on 8,150 acres.
- ◆ Reduced P_2O_5 application by 19 lbs/ac/yr on 7,600 acres.

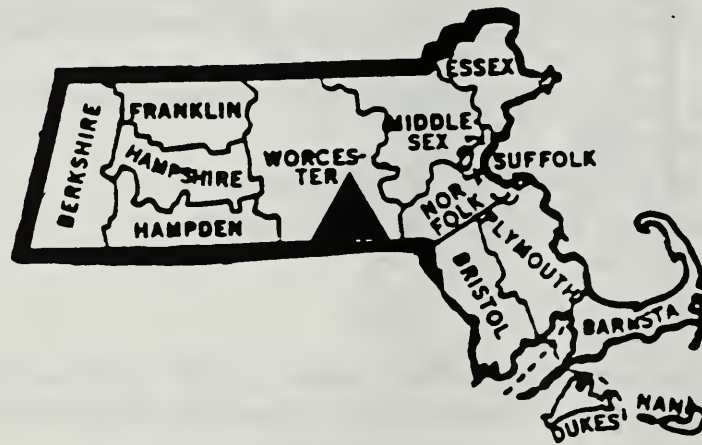
ACTIVITIES:

- ◆ Developed brochures, newsletters to promote water quality in the watershed.
- ◆ Conducted field days, tours and demonstration to promote water quality.
- ◆ Promoted cost share programs and conservation planning.
- ◆ Implemented field scouting of pests for 25 producers on 6,500 acres of corn, wheat, soybeans, barley, and alfalfa.
- ◆ Extensive monitoring system used that includes State Agencies, Smithsonian Institute Estuarine Research Center, and Private Citizen Monitoring.

OTHER AGENCIES: Maryland Department of Agriculture, Natural Resources and Environment; Queen Anne's Soil Conservation District.

REPORTING & EVALUATION: Monitoring export of nutrients; computer modeling; record keeping; living resource monitoring; surface and groundwater sampling; economic data collection.

Massachusetts



▲ **Wachusett Reservoir**

STATE: MASSACHUSETTS
PROJECT NAME: WACHUSETTS RESERVOIR
COUNTIES IN PROJECT: WORCESTER

PROJECT SIZE: 69,000 acres..
STARTED: 1991

CROPS/LIVESTOCK: Vegetables, orchards, nurseries, cranberries, and dairy.

OBJECTIVES: Reduce nutrients, bacteria and toxic substances; develop best management system; reduce pesticide impacts.

IMPACTS:

- ◆ Reduced nitrogen and phosphorus applications 1,272 lbs/ac/year.

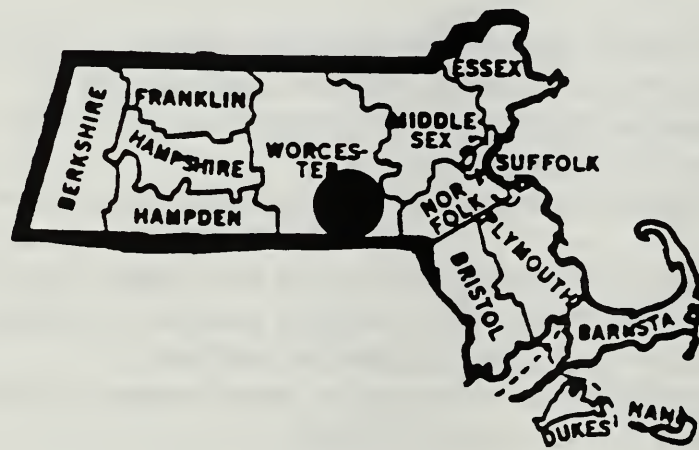
ACTIVITIES

- ◆ Created watershed task force of local officials and organizations to promote dialogue and serve as forum for discussion of water quality issues.
- ◆ Developed turf and landscape Integrated Pest Management (IPM) standards and provided on going training to landscape industry.
- ◆ Developed nutrient and pesticide management plans for six farms within the watershed.
- ◆ Worked with six communities to build the capacity of local health board, and public works' departments, to identify and manage nonpoint sources of pollution.
- ◆ A hazardous waste collection day was conducted in one town.
- ◆ Fourteen teachers received 36 hours of training on water related curricula and resources that are available for use in local schools.
- ◆ Conducted meetings and field days to promote project goals.
- ◆ Held demonstration on erosion control.
- ◆ Utilized National Pesticide Database and User decision support system for Risk Assessment of Ground and surface water contamination (NPURG) computer program with silage production.
- ◆ Held a sustainable crop production tour.
- ◆ Produced fact sheets, brochures and newsletters to promote project goals.

OTHER AGENCIES: Land Use Planner, Metropolitan District Commission.

REPORTING & EVALUATION: Evaluate nutrient management; use the following computer models: Chemical Runoff and Erosion from Agricultural Management Systems (CREAMS), Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), National Pesticide Database and User decision Support System for Risk Assessment of Ground and Surface Water Contamination (NPURG).

Massachusetts



● **Buzzards Bay**

STATE: MASSACHUSETTS

PROJECT SIZE: 246,000 acres.

PROJECT NAME: BUZZARDS BAY

STARTED: 1990

COUNTIES IN PROJECT: PLYMOUTH, BRISTOL, BARNSTABLE

CROPS/LIVESTOCK: Cranberries, sweet corn, vegetables, orchards, hay, and dairy cattle.

OBJECTIVES: Reduce pesticide and nutrient loadings, reduce pollution from storm water runoff, manage nutrient application.

IMPACTS:

- ◆ Seven vegetable producers adopted Integrated Pest Management (IPM) practices on 176 acres of cropland and reduced pesticide application.
- ◆ Alternative cover crop practices were adopted by 12 producers to nutrient applications and soil erosion.
- ◆ Increased public awareness of impairments from non-point sources of pollution.

ACTIVITIES:

- ◆ Developed a vegetable Integrated Pest Management (IPM) program to include nutrient management, cover crops, scouting, pesticide recommendations, potato and cranberry manuals.
- ◆ Implemented nutrient management plans for 11 dairies on 1,286 acres with 1,100 animal units.
- ◆ Developed water education training curriculum which has trained 300 teachers in 13 communities; 7,500 children utilized the curriculum.
- ◆ Designed two innovative stormwater remediation projects.
- ◆ Conducted numerous workshops for over 500 local officials on bufferstrips, stormwater management and conservation practices related to water quality.
- ◆ Implemented long term agreements with producers; plans for water management on cranberry bogs were developed.
- ◆ Seventeen producers installed conservation practices on 1,394 acres of land.
- ◆ Distributed 2,000 septic system packets to homeowners.
- ◆ Promoted cost share programs and conservation planning.
- ◆ Conducted field days and demonstrations to promote water quality.
- ◆ Developed factsheets and newsletters to promote water quality.
- ◆ Held in-service training on soils/pesticide database.

OTHER AGENCIES: Buzzards Bay National Estuary Project, and the Coastal Zone Management Board.

REPORTING & EVALUATION: Tracking reduced inputs of agricultural chemicals and pollutants, on-site monitoring of coliform, hydrocarbons; monitor drinking water supply.

● Sycamore Creek

STATE: MICHIGAN
PROJECT NAME: SYCAMORE CREEK
COUNTIES IN PROJECT: INGHAM

PROJECT SIZE: 67,740 acres.
STARTED: 1990

CROPS/LIVESTOCK: Corn, alfalfa, soybeans, wheat, dairy, beef cattle, and swine.

OBJECTIVES: Promote adoption of Best Management Practices (BMPs) for farmers and homeowners; reduce sedimentation; reduce level of non-point source pollutants from agricultural and urban areas.

IMPACTS:

- ◆ Nitrogen (N) application reduced by 24 lbs per acre per year.
- ◆ Phosphorus (P_2O_5) application reduced by 3 lbs per acre per year.
- ◆ Producers reduced N application by a total of 47.2 tons (saving \$11,311); P_2O_5 by 7.4 tons (saving \$3,452).

ACTIVITIES:

- ◆ Published news release magazines and newsletter articles, brochures, television and radio spots to promote project goals.
- ◆ Conducted tours to highlight BMPs.
- ◆ Established demonstration plots concerning spring nitrate testing, P reduction, cover crops, banded herbicide applications, and soil insecticide reductions.
- ◆ Sponsored well water testing clinic for nitrates to determine baseline data.
- ◆ Using supplemental funds to conduct monitoring in Sycamore Creek for coliform bacteria at three sites.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Implemented long term agreements with producers.
- ◆ Conducted cover crop, intensive rotational grazing, community supported agriculture, community garden pest and nutrient management, and environmentally friendly gardening workshops.
- ◆ Conducted storm drain stenciling projects in concert with 4-H Youth programs.

OTHER AGENCIES: Ingham County Health Department, Michigan Department of Agriculture, and Michigan Department of Natural Resources.

REPORTING & EVALUATION: Quantified fertilizer and pesticide reductions and behavioral and attitude changes; remote sensing to locate gully erosion, measure cropland residue cover, sample all storm flow.

STATE: MICHIGAN
PROJECT NAME: WOLF CREEK
COUNTIES IN PROJECT: LENAWEE

PROJECT SIZE: 48,000 acres.
STARTED: 1991

CROPS/LIVESTOCK: Corn, soybeans, wheat, oats, hay, dairy, and beef cattle.

OBJECTIVES: Reduce chemical loading and amount of sediment and phosphorus entering Lake Adrian, implement and evaluate Best Management Practices (BMPs), and expand the water quality database through rural well testing.

IMPACTS:

- ◆ Two producers reduced phosphorus (P_2O_5) use on 854 acres an average of 37 lbs per acre.
- ◆ Six producers reduced nitrogen (N) usage on 90 acres an average of 10 lbs per acre.
- ◆ The Coshocton wheel chisel plowed plot had 15 times more runoff per acre, 10.7 times higher concentration of sediment, and 2.2 times higher concentration of total phosphorus than the no till plot.

ACTIVITIES:

- ◆ A nitrate testing clinic was held to test water samples for cooperators.
- ◆ A conservation tillage seminar was held to promote soil testing, and nitrate testing.
- ◆ A tree planting seminar was held to promote alternative crops.
- ◆ Long term low input sustainable agriculture plot was implemented.
- ◆ Conservation planning and cost share programs were promoted.
- ◆ Three long term agreements impacting on 914 acres were implemented.
- ◆ Seven Conservation Reserve Program contracts involving 412 acres were implemented.
- ◆ An Integrated Pest Management (IPM) program scouted 289 acres of corn for rootworm adults.
- ◆ A pesticide containment facility was constructed.
- ◆ An IPM training program for producers was conducted.

OTHER AGENCIES: U.S. Geological Survey, City of Adrian, and Lenawee County Health Department.

REPORTING & EVALUATION: Evaluation of BMPs; assisting homeowners to better understand the content and quality of their drinking water; implementation of ASCS programs; implementation of an IPM Program.

Minnesota



● **St. Peter/Prairie Du Chien**

STATE: MINNESOTA

PROJECT SIZE: 145,920 acres.

PROJECT NAME: ST.PETER/PRAIRIE DU CHIEN

STARTED: 1990

COUNTIES IN PROJECT: OLMSTED

CROPS/LIVESTOCK: Corn, soybeans, peas, hay, small grains, dairy, beef, and swine.

OBJECTIVES: Reduce the amount of erosion; improve drinking water quality by reducing nitrate contamination.

IMPACTS:

- ◆ Reduced nitrogen (N) application by 71.3 lbs per acre per year.
- ◆ Reduced phosphorus (P_2O_5) application by 21.8 lbs per acre per year.
- ◆ The average reduction of pesticide application in pounds of active ingredient applied per acre per year relative to baseline use is as follows: (Pesticide trade* name) Dual 0.9, Bladex 0.19, Atrazine 1.2, Banvel (pt) 0.25, Lasso (qt) 0.76, Thiment 0.99, Lorsban 0.51, Marksman (pt) 0.89.

ACTIVITIES:

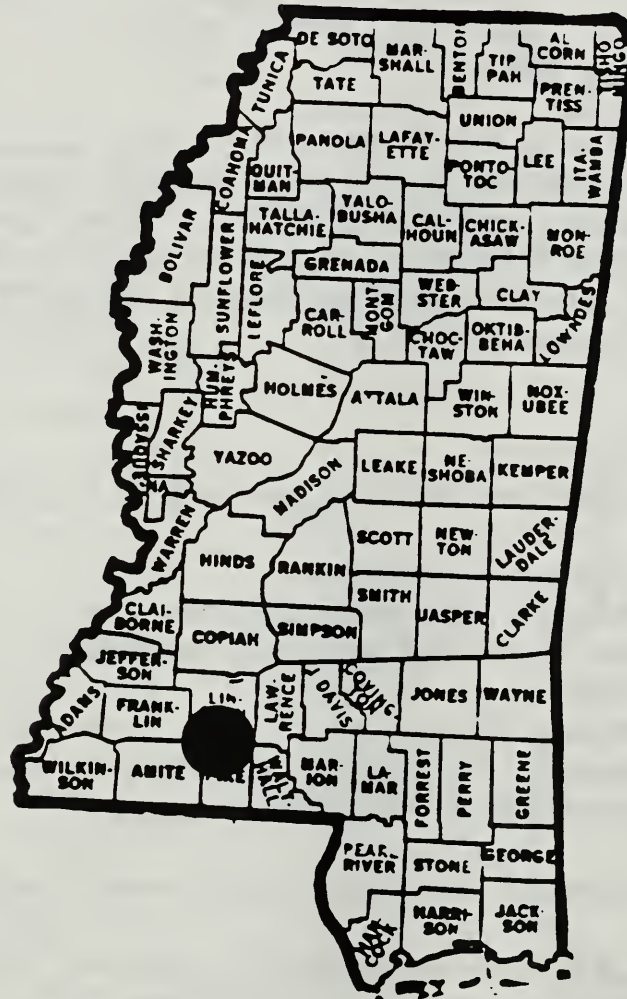
- ◆ Published factsheets, newsletters, brochures and news articles to promote water quality.
- ◆ Participated in local radio and television programs.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Sixty-seven producers installed erosion sediment control practices on 3,492 acres.
- ◆ Installed a manure storage facility.
- ◆ Implemented soil testing manure analysis.
- ◆ Developed 4,164 acres of integrated crop management with 18 landowners.
- ◆ Adopted Farmstead Assessment System (Farm*A*Syst) program.

OTHER AGENCIES: City of Rochester, and Olmsted County Health Department.

REPORTING & EVALUATION: Evaluate impacts of land use planning, monitor wells for coliform bacteria, explore computer aids as means of estimating BMPs, examples are Nitrate Leaching and Economic Analysis Package (NLEAP), Sustaining and Managing Agricultural Resources for Tomorrow (SMART), Farm Financial Management Package (FINPAC), Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), PLANETOR, Manure Application Planner (MAP).

*The use of trade names does not constitute an endorsement by USDA.

Mississippi



● Tangipahoa River

STATE: MISSISSIPPI
PROJECT NAME: TANGIPAHOA RIVER
COUNTIES IN PROJECT: PIKE, AMITE, LINCOLN

PROJECT SIZE: 165,400 acres.
STARTED: 1991

CROPS/LIVESTOCK: Soybeans, corn, grain sorghum, wheat, hay, and dairy.

OBJECTIVES: Reduce nutrients, organic matter, bacteria, and sediment loading, increase landowner knowledge of the impacts of agricultural activities on water quality; encourage adoption of Best Management Practices (BMPs).

IMPACTS:

- ◆ Terraces have reduced soil loss by 25%.
- ◆ Conservation tillage resulted in 50% reduction in soil loss.

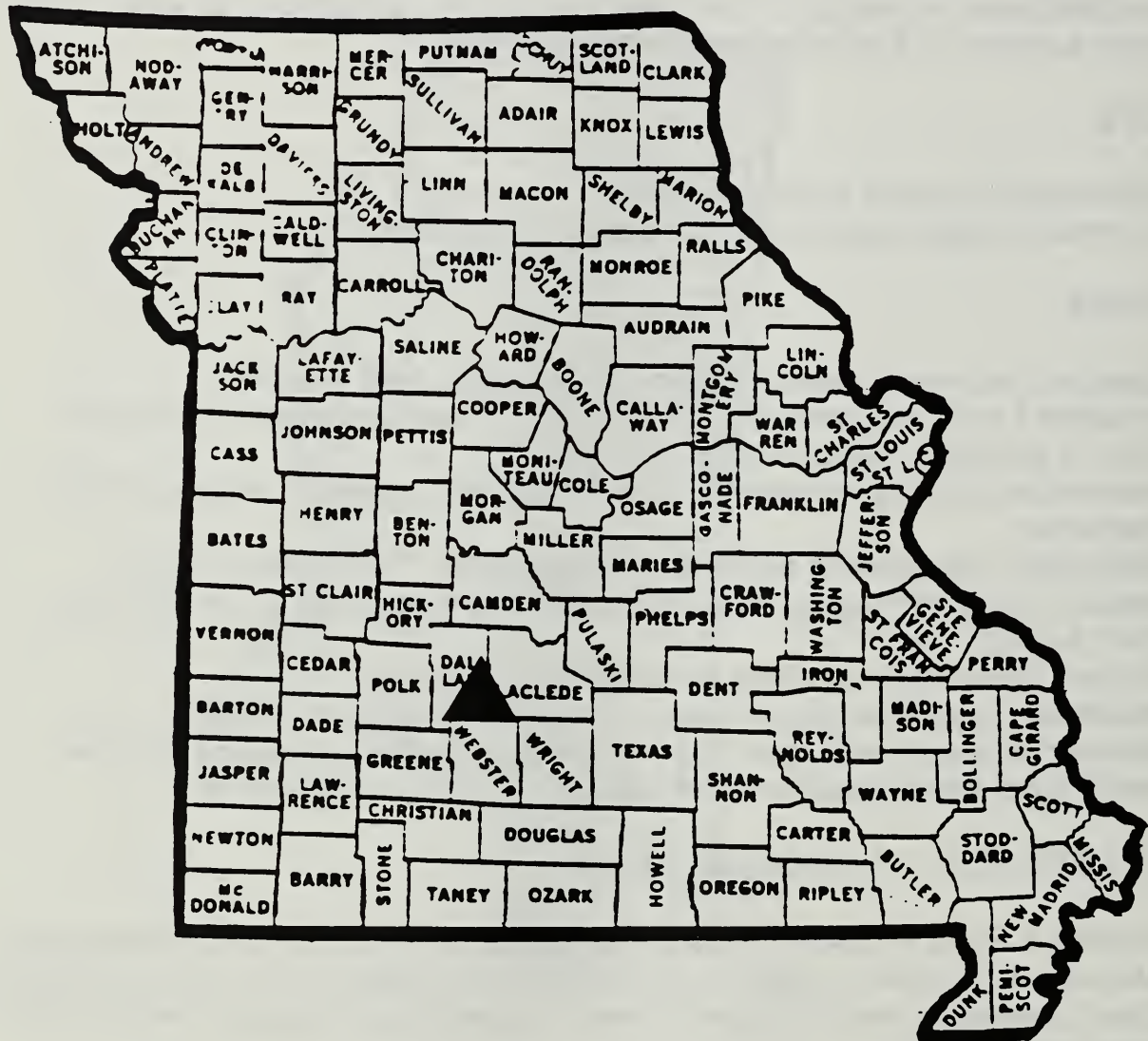
ACTIVITIES:

- ◆ Established well water testing program. 62 domestic wells sampled.
- ◆ Conducted 5 radio programs, 2 dairy field days, 1 waste management program, 4 tours, 6 applicator pesticide training sessions.
- ◆ Conservation practices implemented include terracing, contours, pasture and hay management.
- ◆ Animal waste management systems were conducted. Four planned for 93.
- ◆ Installed 16 long term agreements which will result in reduction in sediment and nutrient loading.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Established a lagoon pumping system. Five lagoons pumped in 92/93.
- ◆ Farmstead Assessment System (Farm*A*Syst)/Homestead Assessment System (Home*A*Syst) being adapted for field testing.

OTHER AGENCIES: U.S. Geological Survey.

REPORTING & EVALUATION: Procedures and guidelines in the Waste Management Field Manual will be used to determine load reductions; stream monitoring procedures have been developed; one major storm event was sampled; evaluate baseline data to determine water quality.

Missouri



▲ Upper Niangua

STATE: MISSOURI

PROJECT SIZE: 457,000 acres.

PROJECT NAME: UPPER NIANGUA RIVER

STARTED: 1991

COUNTIES IN PROJECT: DALLAS, LACLEDE, WEBSTER

CROPS/LIVESTOCK: Hay, pasture, dairy, and beef cattle.

OBJECTIVES: Reduce excessive nutrients and pesticides.

IMPACTS:

- ◆ The four animal waste facilities installed are preventing an estimated 28% of the waste from 325 dairy cows from reaching the Niangua River; habitat of the Niangua Darter, an endangered species.
- ◆ With N,P,K, only 4 waste management systems with a 325 cow total will keep 18,932 lbs. N, 3,388 lbs. P and 12,622 lbs. K from going to the river annually.

ACTIVITIES:

- ◆ Published newsletters, brochures, and fact sheets to promote water quality.
- ◆ Installed 4 animal waste facilities which will influence reductions in nutrient and pesticide loadings.
- ◆ Conducted field demonstration for producers on merits of incorporating animal waste facilities in their overall management systems.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Six domestic sewage systems have been upgraded.

OTHER AGENCIES: Missouri Department of Natural Resources, U.S. Geological Survey, Missouri Department of Health, Mid America Dairyman.

REPORTING & EVALUATION: Well monitoring; conduct water monitoring.

Montana



● Godfrey Creek

STATE: MONTANA
PROJECT NAME: GODFREY CREEK
COUNTIES IN PROJECT: GALLATIN

PROJECT SIZE: 8,960 acres.
STARTED: 1990

CROPS/LIVESTOCK: Potatoes, hay, small grains, dairy, and beef.

OBJECTIVES: Reduce suspended sediment, fecal coliform and nitrate loading.

IMPACTS:

- ◆ Erosion control practices have been implemented by 35 producers on 3,242 acres.
- ◆ Fifteen producers have implemented practices which will aid in sedimentation control on 243 acres.
- ◆ Seven producers have implemented positive changes in irrigation water management on 1,854 acres.

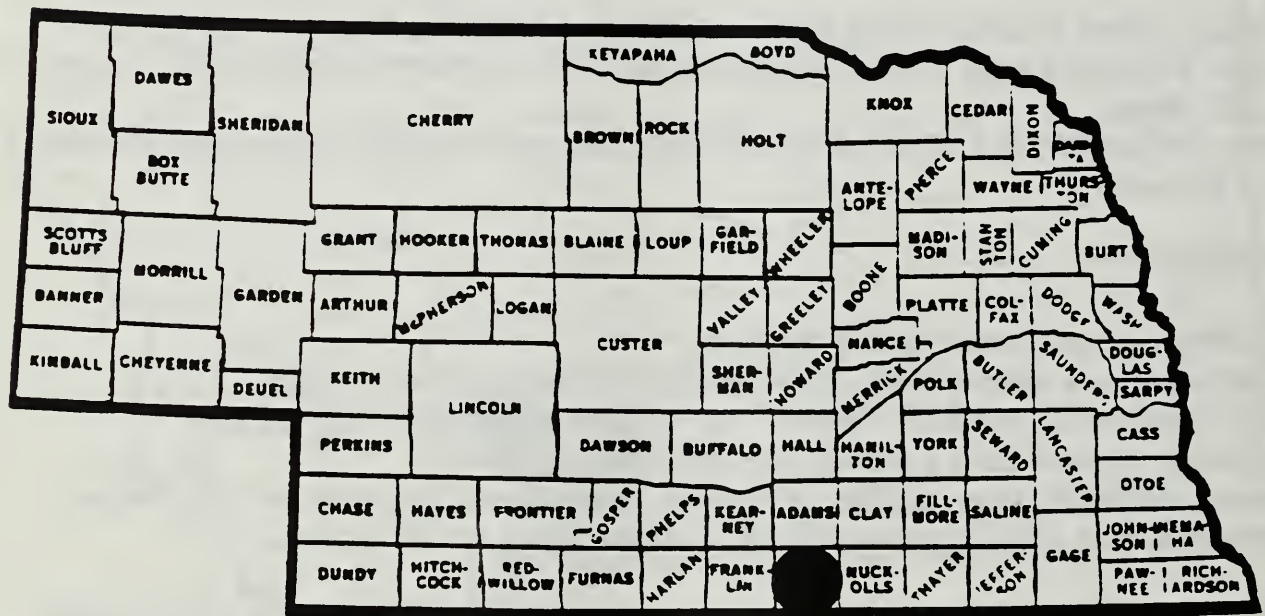
ACTIVITIES:

- ◆ Implemented well water testing program.
- ◆ Published news articles, newsletters and brochures to promote goals.
- ◆ Conducted tours, meetings, one-on-one contacts to promote water quality.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Eleven producers have applied 16 nutrient management practices on 2,699 acres.
- ◆ Two producers have improved waste utilization plans on 160 acres.

OTHER AGENCIES: Montana Department of Natural Resources, Montana Water Quality Bureau, Montana Fish, Wildlife and Parks, and Environmental Protection Agency.

REPORTING & EVALUATION: Three impact stations will be sampled for water chemistry and aquatic biology; cowfish habitat capability model, photo-transect procedure, coldwater stream appraisal will be used in monitoring.

Nebraska



● Elm Creek

STATE: NEBRASKA
PROJECT NAME: ELM CREEK
COUNTIES IN PROJECT: WEBSTER

PROJECT SIZE: 35,800 acres.
STARTED: 1990

CROPS/LIVESTOCK: Irrigated wheat, corn, sorghum, and fish.

OBJECTIVES: Reduce sediment load; reduce irrigation runoff, pesticides, fertilizers and animal waste in runoff entering the creek.

IMPACTS:

- ◆ Application of integrated crop management (ICM) practice resulted in 25 lbs. per acre reduction in nitrogen application.
- ◆ Permanent cover on 53 acres reduced soil erosion tons per acre per year for a saving of 848 tons per year.
- ◆ Cropland protection practices reduced soil erosion to 5 tons per acre per year on 2,647 acres for a saving of 1,391 tons per year on irrigated land.
- ◆ Seeding practices reduced ephemeral erosion by 832 tons on 160 acre farm on irrigated land.
- ◆ On dryland - reduced soil erosion to 4 tons per acre per year for a saving of 1,600 tons per year on 14,600 acres.
- ◆ Reduced ephemeral erosion to 29 tons per acre per year for a saving of 588 tons on a 160 acre farm.
- ◆ On rangeland: - reduced soil loss to 0 tons per acre per year for a saving of 480 tons on 16,000 acres. - reduced gully erosion to 74 tons per acre per year, a 100 ton savings on a 160 acre farm.

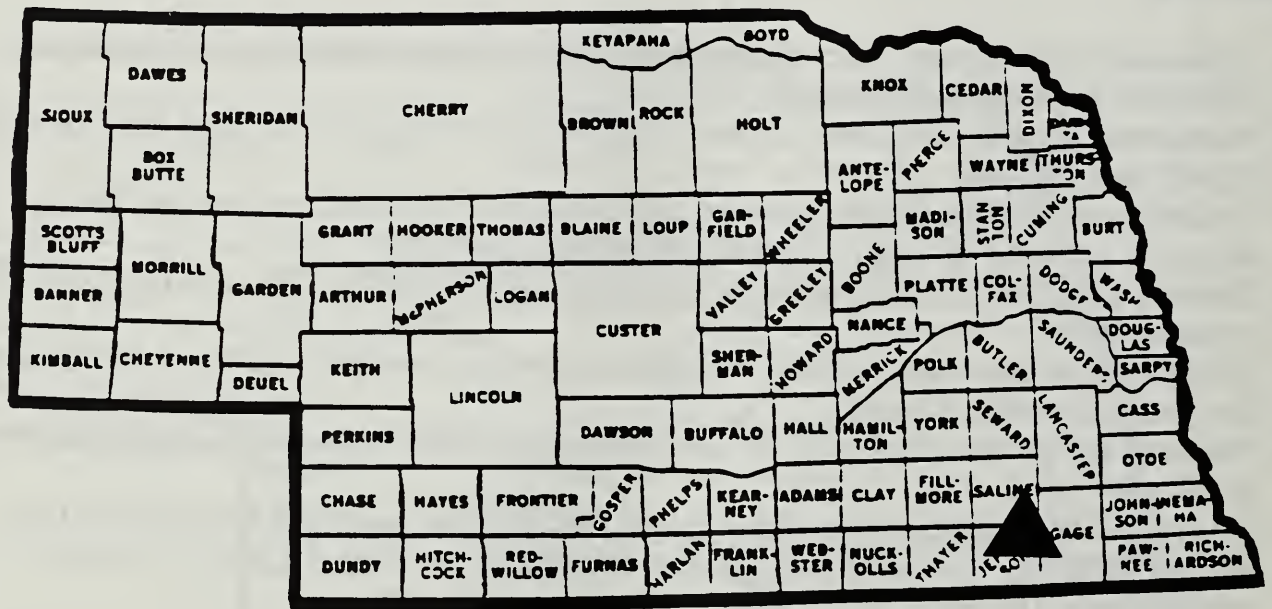
ACTIVITIES:

- ◆ News releases, radio and TV programs, factsheets, surveys have all been utilized to promote water quality within the watershed.
- ◆ Fifteen 4-H members and 5 leaders donated 80 hours in planting over 370 trees.
- ◆ Twenty-eight cooperators implemented erosion control practices on 2,070 acres.

OTHER AGENCIES: Nebraska Department of Environmental Quality, the Nebraska Game and Parks Commission, Lower Republican Natural Resource District, and Environmental Protection Agency.

REPORTING & EVALUATION: Water samples will be taken to monitor water temperature, total suspended solids, nitrates and fecal bacteria.

Nebraska



▲ **Central Blue Valley**

STATE: NEBRASKA

PROJECT SIZE: 92,160 acres.

PROJECT NAME: CENTRAL BLUE VALLEY

STARTED: 1991

COUNTIES IN PROJECT: GAGE, JEFFERSON, SALINE

CROPS/LIVESTOCK: Hay, row crop, vegetables, berries, orchards, vineyards, beef, dairy, swine, sheep and poultry.

OBJECTIVES: Reduce nitrogen inputs; decrease water use and pesticide application.

IMPACTS:

- ◆ Twenty-four cooperators in the watershed have reduced nitrogen (N) application by 26 lbs/acre.
- ◆ Loss of N due to surface runoff was reduced by 50% on 620 acres as a result of surge irrigation practices.
- ◆ Nitrogen loss through the root zone into the vadose zone is estimated to have been reduced by 65% on 1306 acres.
- ◆ Reduced N application with 63 cooperators by 21 lbs/acre on 5,580 acres.
- ◆ 18.6 lbs per acre of N saved without affecting yield in 1991.
- ◆ Reduced N application by 15 lbs per acre per year.

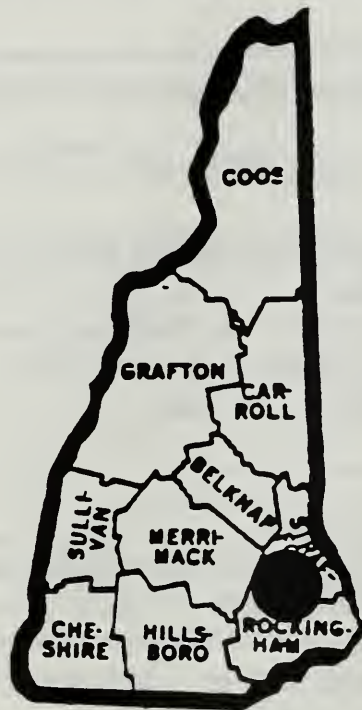
ACTIVITIES:

- ◆ Produced radio programs, newsletters, brochures, and fact sheets to promote water quality within the watershed.
- ◆ Sealed five abandoned wells in 1992.
- ◆ Implemented nitrogen fertilizer management on 1,326 acres with 24 cooperators through use of deep nitrate-nitrogen sampling.
- ◆ Implemented 39 long term agreements which will result in reduced impact from nutrient and pesticide application.
- ◆ Thirty-four nutrient management practices have been applied on a total of 4,605 acres.

OTHER AGENCIES: U.S. Geological Service, Nebraska Department of Environmental Quality.

REPORTING & EVALUATION: Testing of wells; evaluate reduced loading; monitor underground water level; monitor nutrient content; irrigation scheduling.

New Hampshire



● Great Bay

STATE: NEW HAMPSHIRE
PROJECT NAME: GREAT BAY

PROJECT SIZE: 503,200 acres.
STARTED: 1990

COUNTIES IN PROJECT: ROCKINGHAM, STRAFFORD

CROPS/LIVESTOCK: Orchards, corn, fruits, vegetables, dairy, beef, and sheep.

OBJECTIVES: Reduce soil erosion, provide cost sharing for pest management, reduce pollution from manures, nutrients, and pesticides.

IMPACTS:

- ◆ Reduced nitrogen application for ground-surface water by 35 lbs per acre per year.
- ◆ Reduced phosphorus application for ground-surface water by 18 lbs per acre per year.
- ◆ Reduced atrazine (hericides) use by 0.75 lbs a.i. (active ingredient) per acre per year.

ACTIVITIES:

- ◆ Information on composting and pesticide reached 300 growers.
- ◆ Encouraged 300 producers to practice scouting fields for pests, reducing pesticides and working towards reaching economic threshold.
- ◆ Sixty people attended workshops on use of plants for erosion control.
- ◆ Promoted conservation planning and cost share programs.

OTHER AGENCIES: New Hampshire Department of Environmental Services, Rockingham County Conservation District, and Strafford County Conservation District.

REPORTING & EVALUATION: Ambient sampling program for total phosphorus, nitrogen, and chlorophyll; nutrient balance calculations, keeping records of reductions in pesticide and nutrient use.

New Hampshire



▲ Upper Connecticut

STATE: NEW HAMPSHIRE

PROJECT SIZE: 378,400 acres.

PROJECT NAME: UPPER-CONNECTICUT RIVER **STARTED:** 1991

COUNTIES IN PROJECT: GRAFTON

CROPS/LIVESTOCK: Hay, corn, beef, and dairy cattle.

OBJECTIVES: Reduce non-point source water pollution from agricultural, forest, and urban lands and streambanks.

IMPACTS:

- ◆ Reduced nitrogen (N) application by 35 lbs per acre per year.
- ◆ Reduced phosphorus application by 18 lbs per acre per year.
- ◆ Reduced atrazine (herbicides) use by 0.75 pound of active ingredient per acre per year.
- ◆ Soil tests have influenced a savings in N of 15,000 pounds.
- ◆ Publications, radio spots, newsletters, and direct communication on well testing and septic systems reached over 2,000 people. 50 are known to have changed their practices as a result.

ACTIVITIES:

- ◆ Held demonstrations, workshops, meetings, one-on-one contacts to promote water quality within the watershed.
- ◆ Fifty people were contacted directly and 1000 people indirectly at 2 exhibits and given information on household and lawn garden practices, hazardous and septic systems.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Information on composting reached 300 people.

OTHER AGENCIES: New Hampshire Department of Environmental Services, and New Hampshire Timberland Association.

REPORTING & EVALUATION: Computer models will be used; evaluate/monitor the impact of nutrient and pesticide application.

New Jersey



▲ Great Swamp

STATE: NEW JERSEY
PROJECT NAME: GREAT SWAMP
COUNTIES IN PROJECT: MORRIS, SOMERSET

PROJECT SIZE: 35,500 acres.
STARTED: 1991

CROPS/LIVESTOCK: Fruits, vegetables, soybeans, corn, horses, beef, and sheep.

OBJECTIVES: Reduce fertilizer and pesticide impacts, determine water quality impairments, determine impact of hydrologic changes on watershed.

IMPACTS:

- ◆ Increased public awareness of reducing nonpoint source pollution within the watershed.
- ◆ Increased grower awareness of reducing the impact of nutrients and pesticides application within the project.

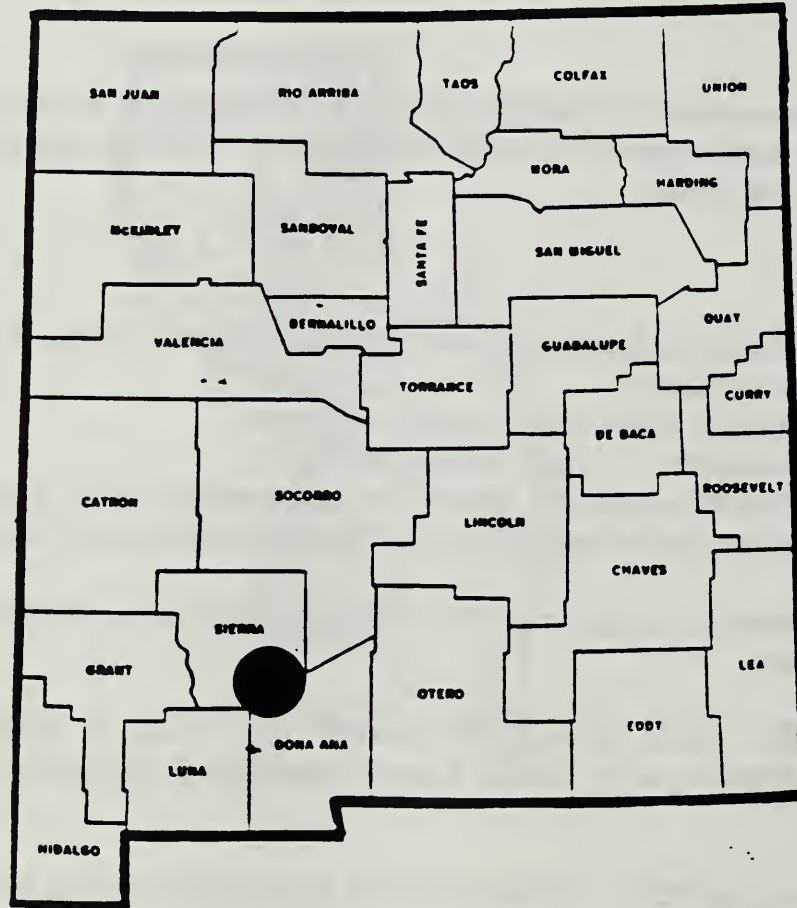
ACTIVITIES:

- ◆ Newsletters, 2,000 mailing lists, factsheets, slide shows were some of the methods used to promote water quality.
- ◆ Developed a geographic information system database.
- ◆ Created 6 satellite displays for high visibility locations.
- ◆ Created a watershed data layer on sewer and un-sewered service areas.
- ◆ Developed information awareness on nutrient loadings and animal densities within the watershed.
- ◆ Estimated the amount of phosphorus and nitrogen produced by domestic and agricultural animals.

OTHER AGENCIES: U.S. Geological Survey, U.S. Fish & Wildlife Services, Environmental Protection Agency, Great Swamp Watershed Association, U.S. Forest Service.

REPORTING & EVALUATION: Monitor different agricultural models for evaluation of water quality; examples of the models are: Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), Chemical, Runoff, and Erosion from Agricultural Management Systems (CREAMS), and Agricultural Nonpoint Source (AGNPS).

New Mexico



● Dona Ana/Sierra

STATE: NEW MEXICO
PROJECT NAME: DONA ANA/SIERRA
COUNTIES IN PROJECT: DONA ANA, SIERRA

PROJECT SIZE: 194,000 acres.
STARTED: 1990

CROPS/LIVESTOCK: Turf, silage corn, potatoes, vegetables, dairy and poultry.

OBJECTIVES: Reduce/manage the loading of nutrients, improve agricultural pest management practices; increase irrigation efficiency; reduce potential nitrate contamination from confined animal feeding operations; educate the general public on water quality issues.

IMPACTS:

- ◆ More efficient fertilizer usage.
- ◆ Improved irrigation efficiency.
- ◆ Lower nitrate levels in monitored wells.
- ◆ Increased public awareness of potential sources of nonpoint source pollution.

ACTIVITIES:

- ◆ Published news articles and factsheets to increase public awareness of the project.
- ◆ Held training sessions, meetings, TV and radio spots on water quality protection.
- ◆ Developed 13 conservation plans with 13 producers in 1991.
- ◆ Conducted one irrigation water quality field day.
- ◆ Promoted conservation plans and cost share programs.
- ◆ Produced videos on Pesticide Applicator Training (PAT).
- ◆ Implemented nitrate testing within the project area.
- ◆ Implemented irrigation scheduling efficiency practices with 16 producers.
- ◆ Developed multi-media educational display for public programs.
- ◆ Charted seasonal soil nitrate levels to be correlated with specific cultural practices.
- ◆ Conducted project area wide in-school water quality program.

OTHER AGENCIES: Elephant Butte Irrigation District, New Mexico State Engineer's Office, and New Mexico Environmental Department.

REPORTING & EVALUATION: Economic analysis of Best Management Practice (BMP) adoption, soil nitrate correlations with changed management practices, post project survey of project cooperators and general farming community.

New York



● East Sidney Lake

STATE: NEW YORK
PROJECT NAME: EAST SIDNEY LAKE
COUNTIES IN PROJECT: DELAWARE

PROJECT SIZE: 70,800 acres.
STARTED: 1990

CROPS/LIVESTOCK: Corn, hay, and dairy cattle.

OBJECTIVES: Reduce nutrient enrichment of the reservoir by reducing erosion, properly manage animal waste septic systems; cost sharing for integrated crop management.

IMPACTS:

- ◆ Installed conservation practices which resulted in 315 tons of soil saved on 309 acres.

ACTIVITIES:

- ◆ Implemented well water testing program.
- ◆ Prepared nutrient and pest management plans on 2,741 acres.
- ◆ Prepared waste management plans for 22,201 tons for 16 farms.
- ◆ Published newsletters, bulletins, newsarticles, factsheets and radio spots to promote project goals within the watershed.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Implementation of reduced tillage resulted in reduced crop production costs.
- ◆ Conducted workshops on care and maintenance of home septic systems.

OTHER AGENCIES: U.S. Army Corps of Engineers, New York Department of Environmental Protection, and New York Division of Fish and Wildlife.

REPORTING & EVALUATION: Mathematical models such as Erosion Productivity Impact Calculator (EPIC), Barnyard Area Runoff Nutrient Yield (BARNY), General Watershed Loading Function (GWLF) and Agricultural Manure Management (AGMAN) will be run to identify loadings, Geographic Information System (GIS) will be used to evaluate delivery ratios.

North Carolina



● Goshen Swamp

STATE: NORTH CAROLINA

PROJECT SIZE: 133,290 acres.

PROJECT NAME: GOSHEN SWAMP

STARTED: 1990

COUNTIES IN PROJECT: DUPLIN, SAMPSON, WAYNE

CROPS/LIVESTOCK: Corn, soybeans, vegetables, small grain, tobacco, cotton, swine, turkeys, and broilers.

OBJECTIVES: Reduce nutrient and pesticide transport to surface and groundwater, reduce cropland erosion and sedimentation; accelerate the adoption of Best Management Practices (BMPs).

IMPACTS:

- ◆ Sixty-five producers have installed management and enduring practices on 4,819 acres.
- ◆ Treating 11,963 acres of cropland for erosion control resulted in 34,113 tons of soil saved.
- ◆ Nutrient and/or pest management were implemented on 8,652 acres.
- ◆ Waste management systems were implemented with 5 producers on 342 acres.
- ◆ Recycled 3,000 lbs of pesticide containers.

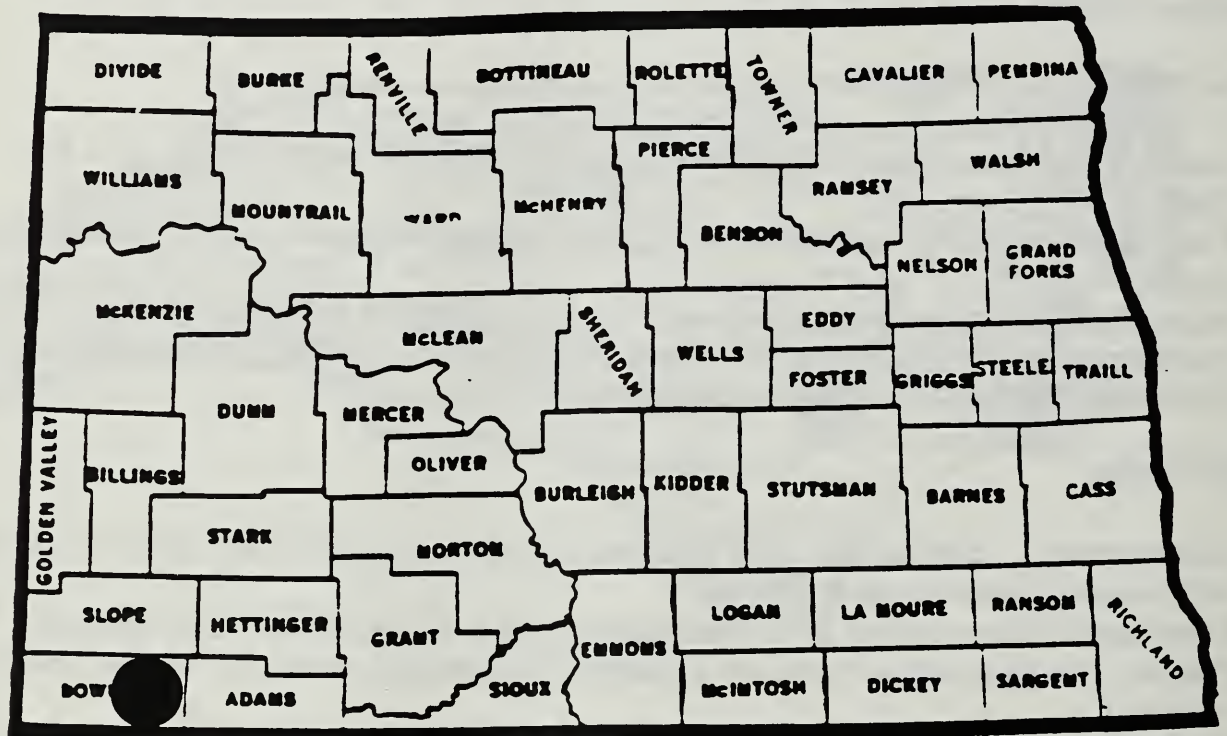
ACTIVITIES:

- ◆ Approximately 1,500 people have attended various tours, field days, demonstrations and meetings about project activities.
- ◆ Developed nutrient and/or pest management plans for 17,996 acres of cropland.
- ◆ Planned management and enduring practices for erosion control for 18,524 acres of cropland.
- ◆ Developed waste management systems for 34 producers to apply animal waste on 1,165 acres.
- ◆ Designed and constructed a pesticide mixing and loading station.
- ◆ Designed a constructed wetland to help treat animal waste.

OTHER AGENCIES: USDA-Agricultural Research Service, the U.S. Geological Survey, the North Carolina Department of Environmental Control, and North Carolina Department of Health and Natural Resources.

REPORTING & EVALUATION: Model results from the Herrings Marsh Run Water Quality Demonstration Project, which is within the Goshen Swamp Project, will be extrapolated to predict the water quality impacts of Best Management Practices (BMPs) implemented in the project area.

North Dakota



● **Bowman/Haley**

STATE: NORTH DAKOTA
PROJECT NAME: BOWMAN/HALEY
COUNTIES IN PROJECT: BOWMAN

PROJECT SIZE: 320,640 acres.
STARTED: 1990

CROPS/LIVESTOCK: Small grains, hay, pasture, beef and sheep.

OBJECTIVES: Reduce excessive erosion; reduce nutrient loading from animal waste; enhance rangeland; improve quality of wildlife habitat; develop Geographic Information System (GIS) coverage, provide technical service for all minorities, provide cost share assistance.

IMPACTS:

- ◆ Reduced wind erosion from 15% to 4%.
- ◆ Reduced nutrient and sediment loading by 25%.
- ◆ Increased public awareness of reducing the impact of non point source pollution impairments.

ACTIVITIES:

- ◆ Developed and distributed newsletters and fact sheets about project goals.
- ◆ Conducted tours, one-on-one contacts, and field days to promote water quality within the watershed.
- ◆ Implemented demonstrations such as: test plots of six alfalfa varieties, a grass test plot of 36 varieties, and two tillage residues.
- ◆ Implemented sealing of abandoned wells.
- ◆ Implemented long term agreements.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Conducted radio and TV broadcasts, and conducted workshops.

OTHER AGENCIES: U.S. Army Corps of Engineers, U.S. Fish & Wildlife Service, North Dakota Game and Fish Department, Custer National Forest, Ducks Unlimited, North Dakota Health Department, Bowman County Water Board.

REPORTING & EVALUATION: Compile well and monitoring sites data; digitize soil survey; evaluation will be based on amount of sediments not delivered, measurement also based on amount of nutrients prevented from entering a reservoir.

Ohio



● Indian Lake

STATE: OHIO

PROJECT SIZE: 63,000 acres.

PROJECT NAME: INDIAN LAKE

STARTED: 1990

COUNTIES IN PROJECT: LOGAN, HARDIN, AUGLAIZE

CROPS/LIVESTOCK: Corn, soybeans, wheat, dairy, beef and swine.

OBJECTIVES: Reduce sediment delivery; provide innovative program incentives.

IMPACTS:

- ◆ Implementation of conservation plans resulted in 30,176 tons of soil saving per year on 6,102 acres.
- ◆ Reduced sediment loading in the watershed by 32% or 25,318 tons per year.
- ◆ Reduced sedimentation into the Indian lake by saving 4,810 tons of soil.

ACTIVITIES:

- ◆ Installed a demonstration sediment retention basin.
- ◆ Held workshops on no-till practices.
- ◆ Produced 83 newspaper articles, 11 magazine articles, 18 newsletters, 5 fact sheets, 8 radio programs, 1 TV show, 21 public presentations, and 2 brochures to promote water quality within the watershed.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Converted 856 acres out of the 45,329.9 acres in watershed into long term agreements.
- ◆ Held workshop on nutrient management.

OTHER AGENCIES: Ohio Environmental Protection Agency, Ohio Department of Natural Resources, Indian Lake Development Corporation, Logan and Hardin County Pheasants Forever Chapters.

REPORTING & EVALUATION: Ohio Environmental Protection Agency will do monitoring in the last two years of the project; tracking land use changes in the watershed; Geographic Information Systems (GIS) will be used.

Ohio



▲ **Darby Creek**

STATE: OHIO

PROJECT SIZE: 338,152 acres

PROJECT NAME: DARBY CREEK

STARTED: 1991

COUNTIES IN PROJECT: CHAMPAIGN, FRANKLIN, LOGAN, MADISON,
PICKAWAY, UNION

CROPS/LIVESTOCK: Corn, soybeans, dairy, and beef cattle.

OBJECTIVES: Reduce sediments; protect riparian corridor; provide nutrient and pest management plans; protect streambanks.

IMPACTS:

- ◆ Conservation tillage has reduced gross erosion by 5,076 tons.
- ◆ Increased public awareness of the biological significance of this natural resource.

ACTIVITIES:

- ◆ Partnership of organizations meet quarterly to review progress and identify new opportunities.
- ◆ Implemented 37 long term agreements on 3,000 acres.
- ◆ Conducted 6 canoe trips to understand the biological significance of Darby Creek. Participants observe a fish elector shocking demonstrations, kick seine for macro invertebrates, and search for fresh water mussels. This program has over 200 graduates.
- ◆ Completed 28 farm demonstrations; 7 in integrated crop management (ICM), 3 in precision crop management, 5 in nitrogen utilization, 4 in insect control, 4 in weed control, 4 in soybean disease control, and 1 in manure management.
- ◆ Conducted a total of 6 field days; 2 in 1992 and 4 in 1993. In addition, 5 other educational programs were conducted related to project objectives.
- ◆ Promoted cost share programs and conservation planning.
- ◆ Produced video, news articles, brochures, and fact sheets on project goals and activities.

OTHER AGENCIES: Environmental Protection Agency, U.S. Geological Survey, U.S. Forest Service, and Ohio Department of Natural Resources.

REPORTING & EVALUATION: Remote sensing; Computer Assisted Management Planning System (CAMPS); chemical and biological.

Oklahoma



● **Battle Branch**

STATE: OKLAHOMA
PROJECT NAME: BATTLE BRANCH
COUNTIES IN PROJECT: DELAWARE

PROJECT SIZE: 37,549 acres.
STARTED: 1990

CROPS/LIVESTOCK: Pasture, hay, poultry, dairy, and beef cattle.

OBJECTIVES: Reduce nutrient levels in the watershed, develop education program to improve producers' understanding of utilizing animal waste, provide technical and financial assistance.

IMPACTS:

- ◆ Nutrient management has influenced 60% of producers to reduce waste application rate and also not apply waste in unsuitable areas.
- ◆ Reduced nitrogen application by 100 pounds per acre per year and phosphorus application by 120 pounds per acre per year.

ACTIVITIES:

- ◆ Thirty-six producers with combined animal operations have developed waste management plans.
- ◆ Implemented 10 ASCS long term agreements and 24 Environmental Protection Agency- Oklahoma Conservation Commission long term water quality agreements on 2,607 acres.
- ◆ Installed conservation practices on 36 waste management systems, 27 waste utilization systems, 20 dead bird disposal systems, 6 waste storage structures, 6 nutrient management plans, 12 household septic systems, and 160 acres of tree planting.

OTHER AGENCIES: Oklahoma Conservation Commission, and Delaware Conservation District.

REPORTING & EVALUATION: Practices will be implemented during on-site visits, manure nutrient and soil nutrient content will be monitored, baseflow stream supplies will be taken monthly.

Oklahoma



Peacheater Creek

STATE: OKLAHOMA
PROJECT NAME: PEACHEATER CREEK
COUNTIES IN PROJECT: ADAIR

PROJECT SIZE: 16,210 acres. . .
STARTED: 1991

CROPS/LIVESTOCK: Poultry, dairy, and beef cattle.

OBJECTIVES: Reduce level of nutrients and bacteria.

IMPACTS:

- ◆ Thirty-two percent of producers have reduced waste application.
- ◆ Over 30% of producers with confined animal operations are implementing animal waste program within the watershed.
- ◆ Reduced nitrogen (N) application by 100 lbs/ac/yr.
- ◆ Reduced phosphorus (P_2O_5) application by 120 lbs/ac/yr.
- ◆ Plans and practices implemented have reduced potential for nutrients, bacteria, and other pollutants displaced and carried by runoff.

ACTIVITIES:

- ◆ Fourteen producers have developed waste management plans for their operations.
- ◆ Nine ASCS long term agreements and 6 Environmental Protection Agency- Oklahoma Conservation Commission long term agreements on 1,643 acres. 9 waste management systems, 9 waste utilization systems, 4 dead bird disposal systems, 2 waste storage structures, 8 nutrient management plans, and 6 ponds.

OTHER AGENCIES: Oklahoma Conservation Commission, and Adair Conservation District.

REPORTING & EVALUATION: Monitor manure nutrient content, soil nutrient levels; well sampling.

A black and white map of the state of Oregon, showing its county boundaries and names. The counties are labeled as follows: Clatsop, Columbia, Tillamook, Washington, Multnomah, Hood River, Clackamas, Wasco, Sherman, Gilliam, Morrow, Umatilla, Walla Walla, Yamhill, Polk, Marion, Lincoln, Benton, Lane, Jefferson, Wheeler, Grant, Baker, Linn, Deschutes, Perry, Coos, Douglas, Curry, Josephine, Jackson, Klamath, Harney, and Malheur. A large black circle is located in the southeastern corner of the state, within Malheur County.

STATE: OREGON
PROJECT NAME: ONTARIO
COUNTIES IN PROJECT: MALHEUR

PROJECT SIZE: 156,000 acres.
STARTED: 1990

CROPS/LIVESTOCK: Onions, sugarbeets, potatoes, alfalfa, wheat, feed corn, seed crops, beef, and dairy cattle.

OBJECTIVES: Reduce sediment entering watershed; reduce nitrogen application; reduce pesticide use.

IMPACTS:

- ◆ Improved irrigation efficiency on 6,500 acres by 12%.
- ◆ Reduced irrigation induced erosion and reduce sedimentation by 15 tons per acre on 5,000 acres.
- ◆ Reduced nitrogen (N) fertilizer applied by 60 lbs/acre on 13,000 acres.

ACTIVITIES:

- ◆ Held meetings, tours and field days with producers and chemical field representatives to promote water quality. Various demonstrations on both nutrient and irrigation management practices. Published water quality newsletters and ran weekly columns in local newspaper.
- ◆ Research on nutrient and irrigation management practices on major crops in project area, include the use of granular matrix sensors, atmometers, and sulfur coated urea.
- ◆ Reviewed and approved water quality cost share and incentive practices. Developed and implemented 55 water quality farm plans on approximately 16,500 acres in 1991 and 1992.

OTHER AGENCIES: Oregon Department of Agriculture, Department of Environmental Quality, Malheur County Soil and Water Conservation District, Oregon Department of Health, and Oregon Water Resources Department.

REPORTING & EVALUATION: Monitoring and updating water quality farm plans; evaluate impacts of installed management systems; Monitoring irrigation return flows for nitrate,, ammonium and phosphorous; well monitoring; vadose zone sampling; computer models being used or tested in the watershed are Furrow Erosion and Sediment Model (FUSED), Farm Irrigation Rating Index (FIRI), Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), Erosion Productivity Impact Calculator (EPIC), Simulator for Water Resources in Rural Basins-Water Quality (SWRRBWQ), and Nitrate Leaching and Economic Analysis Package (NLEAP).

A map of Oregon showing its county boundaries and names. Multnomah County is highlighted in black. The counties shown are: Clatsop, Columbia, Tillamook, Multnomah, Hood River, Washington, Clackamas, Wasco, Sherman, Gilliam, Morrow, Umatilla, Union, Wallowa, Yamhill, Polk, Marion, Lincoln, Benton, Linn, Jefferson, Wheeler, Grant, Baker, Lincoln, Deschutes, Coos, Douglas, Curry, Josephine, Jackson, Elkhart, Lake, Harney, and Malheur.

STATE: OREGON
PROJECT NAME: TUALATIN RIVER
COUNTIES IN PROJECT: WASHINGTON

PROJECT SIZE: 164,070 acres
STARTED: 1991

CROPS/LIVESTOCK: Nurseries, row crops, orchards, seed crops, Christmas trees, cannery produce, dairy, beef, horses, sheep, swine, and poultry.

OBJECTIVES: Reduce sediment, nutrient, and pesticide loadings; reduce bacterial content.

IMPACTS:

- ◆ Reduced phosphorus load from Dairy Creek from 27 lbs, in 1991 to 14 lbs in 1992.
- ◆ Saved 10,740 tons of soil on 1,507 acres.

ACTIVITIES:

- ◆ Held meetings, tours and field days to promote water quality in the project area.
- ◆ Held cover crop demonstrations on blueberries, bush beans, commercial roses, strawberries, sweet corn and christmas trees.
- ◆ Held demonstration on straw mulching and waste handling.
- ◆ Newspaper articles, brochures, fact sheets, publications were used in promoting water quality within the watershed.
- ◆ Developed and implemented cost share contracts for producers.
- ◆ Implemented long term agreements.

OTHER AGENCIES: Oregon Department of Environmental Quality, U.S. Geological Survey, Unified Sewage Agency, Oregon Graduate Institute.

REPORTING & EVALUATION: In-stream water quality monitoring.

STATE: PENNSYLVANIA
PROJECT NAME: PEQUEA/MILL CREEKS
COUNTIES IN PROJECT: LANCASTER

PROJECT SIZE: 135,000 acres.
STARTED: 1991

CROPS/LIVESTOCK: Soybeans, vegetables, corn, small grain, hay, tobacco, dairy, heifers, beef, swine, poultry, and horses.

OBJECTIVES: Reduce sediment and nutrient loads; reduce bacteria, sediment runoff, reduce pesticide contamination.

IMPACTS:

- ◆ Livestock exclusion from streams has resulted in expansion of riparian wildlife habitat.
- ◆ 22 farmers have implemented barnyard runoff control practices that control the impacts of over 900 dairy cows on water quality in the project area.
- ◆ More than 6 miles of stream have been fenced to exclude almost 1,000 dairy cows, replacements, horses, and mules from the streams.

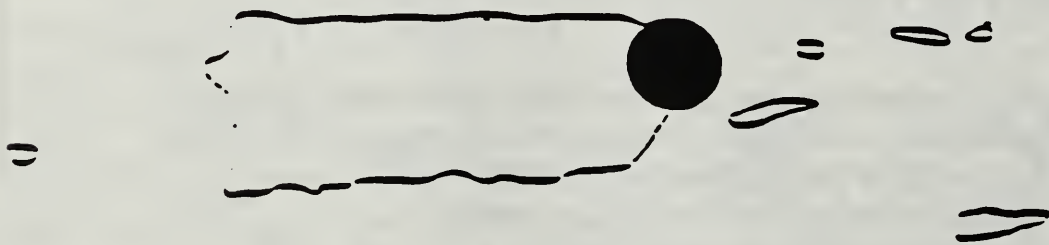
ACTIVITIES:

- ◆ Conducted tours, meetings, and field days to promote water quality.
- ◆ Published factsheets, brochures, newsletters to promote project goals.
- ◆ Developed nutrient and pesticide training courses
- ◆ Developed a project display for exhibition at events.
- ◆ Installed waste storage facilities on 30 farms.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Implemented 45 long term agreements.
- ◆ 500 farmers attended a meeting on nutrient management.
- ◆ 24 farms have implemented barnyard runoff control.
- ◆ 27 farmers have signed long-term agreements on 1721 acres.
- ◆ Over 3,475 copies of Pequea-Mill Creek Project Information Series publications have been distributed.

OTHER AGENCIES: Lancaster Conservation District, Pennsylvania (PA) Department of Agriculture, PA Department of Environmental Resources, PA Fish Commission, PA Game Commission, U.S. Geological Survey, and Environmental Protection Agency.

REPORTING & EVALUATION: Monitoring base flows, record keeping, remote sensing, evaluate nutrient and pesticide loadings; farmstead assessment, habitual evaluation, conservation reporting and evaluation system will be used.

Puerto Rico



● Lake Loiza

STATE: PUERTO RICO

PROJECT SIZE: 101,380 acres.

PROJECT NAME: LAKE LOIZA

STARTED: 1990

COUNTIES IN PROJECT: LAKE LOIZA, in the RIO GRANDE, DE LOIZA WATERSHED

CROPS/LIVESTOCK: Yams, plantains, dasheens, oranges, coffee, sugarcane, pasture, dairy, cattle, poultry, and swine.

OBJECTIVES: Reduce chemical and organic matters entering the watershed, reduce erosion to maintain the resource base; reduce offsite sediment damages.

IMPACTS:

- ◆ Reduced 18,279 tons/ac/year of sediment on 3,937 acres of cropland.

ACTIVITIES:

- ◆ Established two farm demonstration projects for poultry, swine, and dairy cattle.
- ◆ Established a demonstration project on constructed wetland.
- ◆ Installed erosion control practices on 250 acres of cropland.
- ◆ Implemented planting and pasture management practices on 3,700 acres of pasture land.
- ◆ Implemented conservation practices on 1,500 acres of cropland.
- ◆ 240 producers installed conservation practices such as crop residue use, contour farming, waste utilization, and hillside ditches on 2,264 acres.

OTHER AGENCIES: Este and Turabo Conservation Districts, Puerto Rico Environmental Quality Board, and U.S. Geological Survey.

REPORTING & EVALUATION: Field data collected by U.S. Geological Survey on sedimentation rate of the reservoir; Environmental Quality Board will conduct analysis to determine surface and ground water with respect to non-point source impacts in the near future.

Rhode Island



● Pawcatuck

STATE: RHODE ISLAND
PROJECT NAME: PAWCATUCK
COUNTIES IN PROJECT: WASHINGTON

PROJECT SIZE: 194,000 acres.
STARTED: 1990

CROPS/LIVESTOCK: Turf, silage corn, ornamentals, vegetables, dairy, and poultry.

OBJECTIVES: Reduce/manage the loading of nutrients, pesticides and pathogens; maintain water levels to support designated uses; develop support among agricultural and non-agricultural communities for solutions to nonpoint source problems through public information program.

IMPACTS:

- ◆ Average nutrient reductions of 50 lbs/acre on 410 acres (48% of corn cropland) for nitrogen (N) and 20 lbs/acre on 280 acres (33% of corn cropland) for phosphorus (P_2O_5).
- ◆ Trichlorfon (pesticide) application reduced by 8 lbs of active ingredient on 25 acres of managed golf course turf (14% of golf course turf in the project).
- ◆ Irrigation efficiency increased by 30% on 500 acres of irrigated cropland (25% of total irrigated cropland in the project).

ACTIVITIES:

- ◆ Annual farm tour to highlight project activities; 40 people participated in irrigation water management tour in 1992.
- ◆ Soil and manure nutrient testing; 5 producers (50%) participated at 20 locations.
- ◆ Developed of animal waste storage plans/structures to 6 dairy producers (60%) and 1 poultry producer (50%).
- ◆ Innovative irrigation scheduling program used on 500 acres of turf and vegetables (25% of irrigated cropland) using "Scheduler" computer program.
- ◆ Programs to reduce pesticide use and risks. In 1992: National Pesticide/Soils database and User decision support system for risk assessment of ground and surface water contamination National Pesticide/Soils database and User decision support system for risk assessment of ground and surface water contamination (NPURG) model used on 700 acres of potatoes, turf, silage corn; 30 pesticide applicator training courses held with 750 people trained; 5 producers involved in Integrated Pest Management (IPM) programs for sweet corn and turf.
- ◆ GreenShare and homeowner programs implemented to educate the general public about Best Management Practices (BMPs) which can be implemented in the home environment.

OTHER AGENCIES: Rhode Island Department of Environmental Management, Wood-Pawcatuck Watershed Association, Rhode Island Farm Bureau, Coastal Resources Management Council.

REPORTING & EVALUATION: Use computerized simulation models, such as Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), to evaluate BMP's effectiveness; economic evaluation of management systems; evaluate program adoption through direct interactions with producers.

South Carolina



● **Bush/Camping Creek**

STATE: SOUTH CAROLINA

PROJECT SIZE: 129,700 acres.

PROJECT NAME: BUSH/CAMPING CREEK

STARTED: 1990

COUNTIES IN PROJECT: LEXINGTON, NEWBERRY

CROPS/LIVESTOCK: Corn, soybeans, grain sorghum, small grains, pasture, dairy, beef, swine, and poultry.

OBJECTIVES: Reduce erosion, reduce animal waste impact on streams and water bodies; monitor water bodies in watershed area, provide financial and technical assistance, implement information program.

IMPACTS:

- ◆ More than 21,000 tons of soil were saved on 73 tracts in 1991.
- ◆ Improved fishery habitat due to sediment reduction to streams.

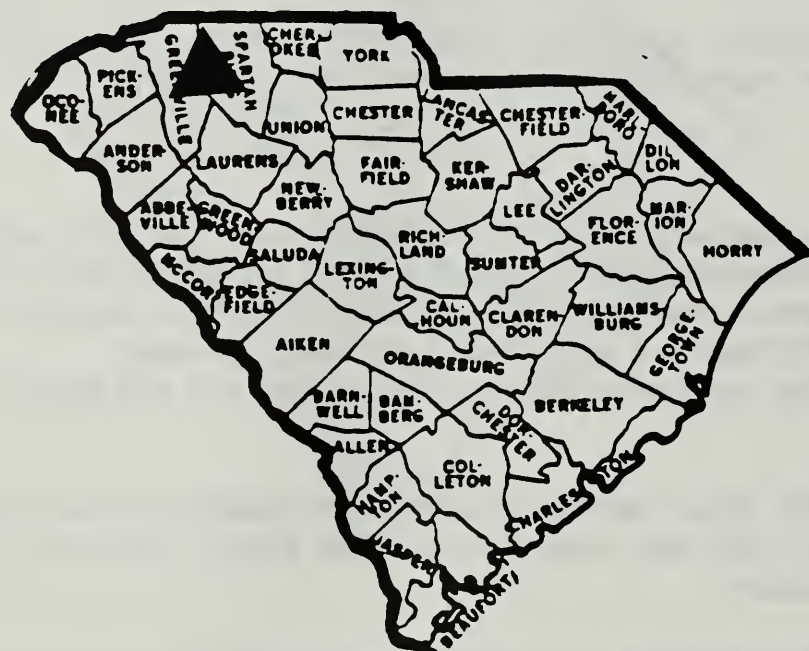
ACTIVITIES:

- ◆ 25 landowners implemented long term agreements on over 3,000 acres in 1990.
- ◆ Established a research project on poultry manure application rates on wheat.
- ◆ Installed conservation practices in 1990 include: - 10 livestock watering facilities, waste utilization on 3,600 acres, 8 ponds, and 5,000 feet of terraces.
- ◆ Technical services provided to 88 landusers resulted in 3,473 acres being treated.

OTHER AGENCIES: South Carolina Department of Health and Environmental Control, U.S. Forest Service, Soil and Water Conservation District, and South Carolina Land Resources Commission.

REPORTING & EVALUATION: Monitor dissolved oxygen, pH, temperature, conductivity and fecal coliform, Geographic Information System (GIS) will be used for tracking trends and changes, the Agricultural Nonpoint Source (AGNPS) model will also be used as a comparative analysis tool.

South Carolina



▲ Lake Bowen

STATE: SOUTH CAROLINA

PROJECT SIZE: 60,000 acres.

PROJECT NAME: LAKE BOWEN

STARTED: 1991

COUNTIES IN PROJECT: GREENVILLE, SPARTANBURG

CROPS/LIVESTOCK: Fruits, vegetables, small grains, hay crops, corn, soybeans, pasture, dairy, sheep, swine, beef, and horses.

OBJECTIVES: Reduce nutrient, pesticide and nutrient loadings; monitor water bodies in the watershed.

IMPACTS:

- ♦ Implemented conservation practices with 60 landusers which resulted in a saving of 3,459 tons of soil.

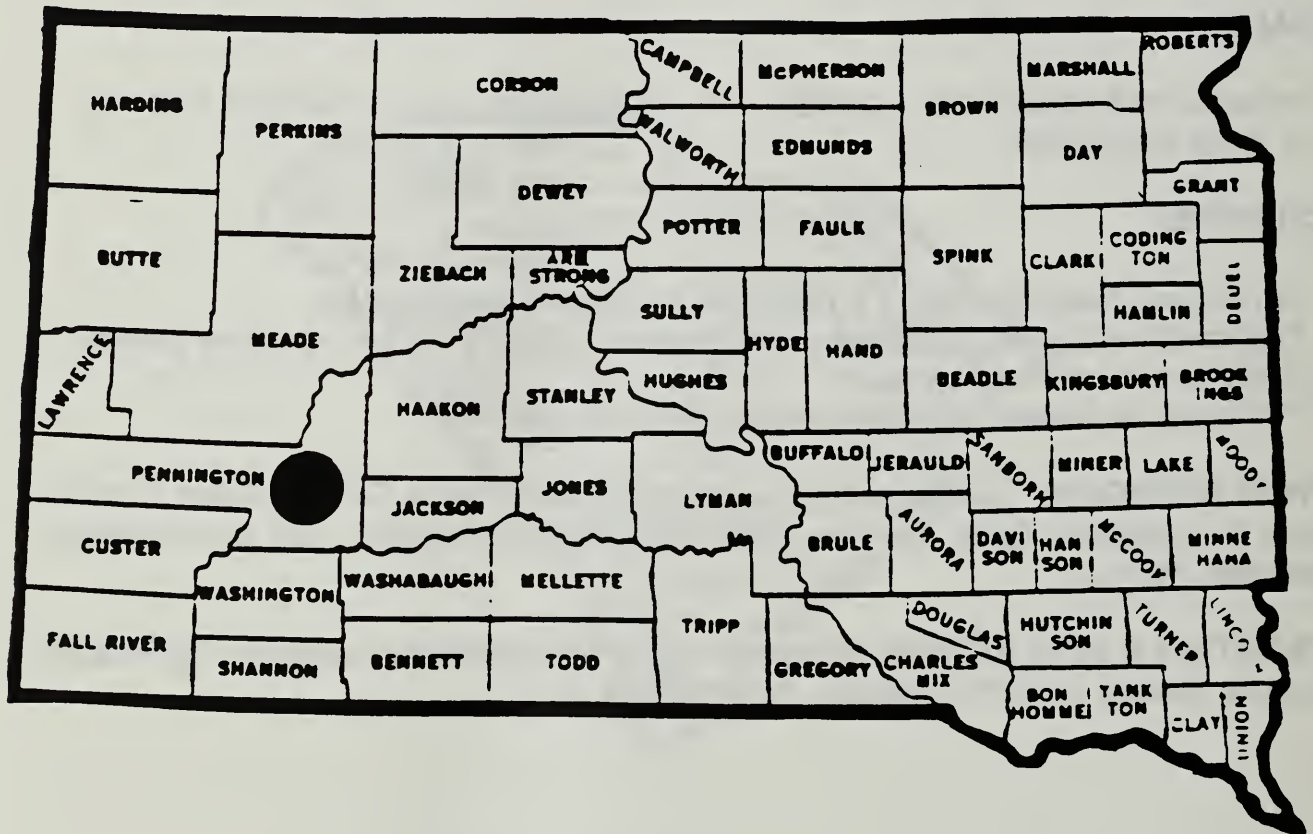
ACTIVITIES:

- ♦ Conducted meetings, fairs, TV programs to promote project goals.
- ♦ Published brochures, factsheets, newsletters to inform producers and the general public about water quality goals.
- ♦ Promoted cost-share programs and conservation planning

OTHER AGENCIES: Department of Health and Environmental Control, South Carolina Forest Commission, South Carolina Land Resource Commission, and Environmental Protection Agency.

REPORTING & EVALUATION: Monitor biological and physical parameters; Agricultural Nonpoint Source (AGNPS) pollution model will be used.

South Dakota



● **Richmond Lake**

STATE: SOUTH DAKOTA

PROJECT SIZE: 92,000 acres.

PROJECT NAME: RICHMOND LAKE

STARTED: 1990

COUNTIES IN PROJECT: BROWN, EDMUNDS, MC PHERSON

CROPS/LIVESTOCK: Pasture, hay, and beef cattle.

OBJECTIVES: Control feedlot runoff, reduce livestock waste, reduce soil erosion, install shoreline structures; reduce septic system impact on water quality.

IMPACTS:

- ◆ Reduced phosphorus by 2 tons per year on the average.
- ◆ Reduced sediment lost by .008 ton/ac/yr.
- ◆ Reduced nitrogen and phosphorus losses from the root zone by 100 pounds each on 2,486 acres of cropland.

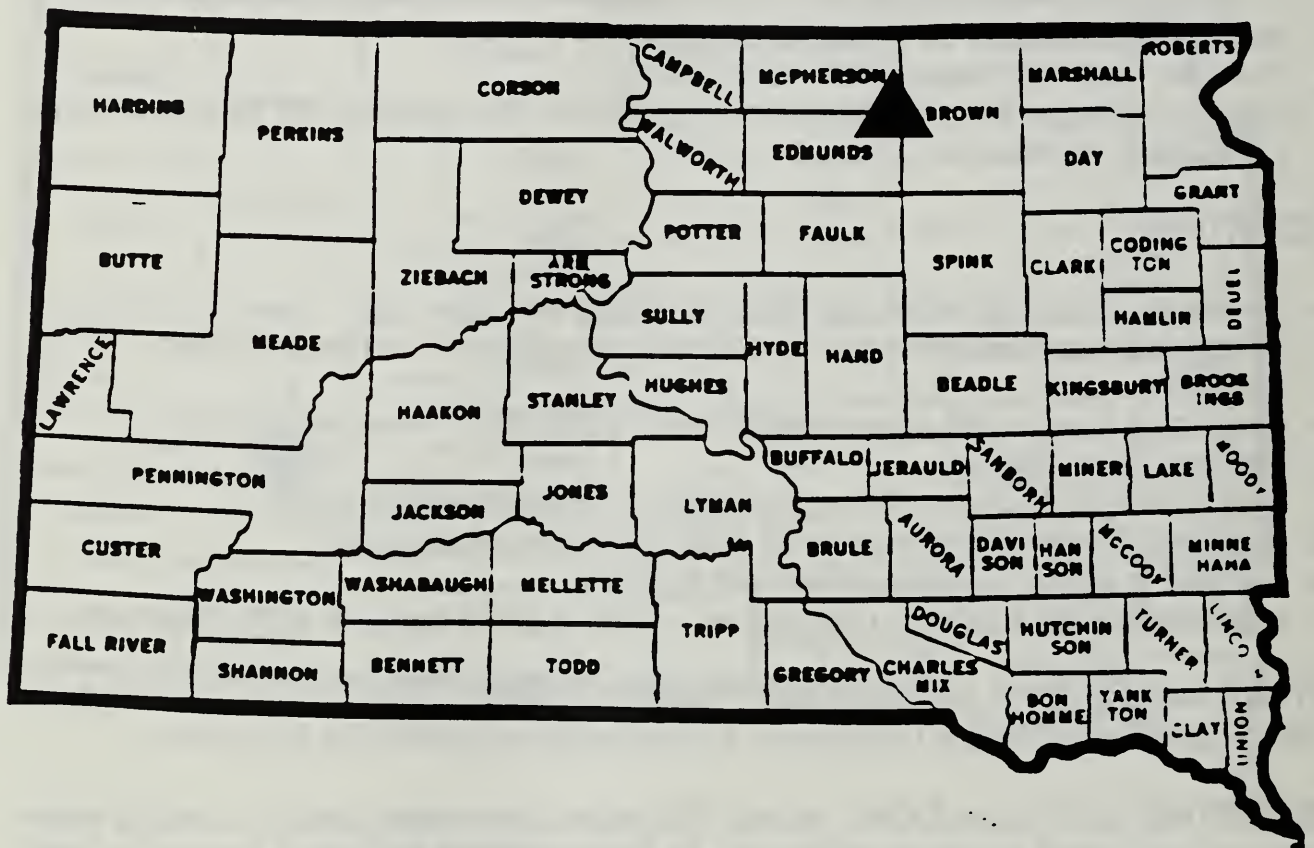
ACTIVITIES:

- ◆ Developed a mailing list of over 200 individuals and agencies.
- ◆ Developed factsheets for agricultural waste management and septic system installation.
- ◆ Developed 2 television news spots, 2 radio spots, and 3 newsreleases to promote water quality.
- ◆ Held meetings, tours, one-on-one contacts, to promote water quality.
- ◆ Designed shoreline stabilization for 2240 linear feet of shoreline.
- ◆ Installed 3 animal waste management facilities.
- ◆ Implemented conservation practices on a total of 3,649 acres of agricultural land.

OTHER AGENCIES: Environmental Protection Agency, South Bound Conservation District, and South Dakota Department of Environment and Natural Resources.

REPORTING & EVALUATION: Monitor Richmond Lake water quality to sample water entering lake; water analysis will be done by Environmental Protection Agency for fecal coliform bacteria, suspended solids, phosphorus, nitrates, and chlorophyll.

South Dakota



▲ Lower Rapid Creek

STATE: SOUTH DAKOTA
PROJECT NAME: LOWER RAPID CREEK
COUNTIES IN PROJECT: PENNINGTON

PROJECT SIZE: 196,601 acres.
STARTED: 1991

CROPS/LIVESTOCK: Hay, pasture, sheep, dairy, and beef cattle.

OBJECTIVES: Reduce sediment load; promote proper pesticide and fertilizer use.

IMPACTS:

- ◆ Erosion control practices have saved 14,700 tons of soil that has the potential of reaching Rapid Creek.
- ◆ Implemented nutrient, pest, and erosion control plans to reduce nutrient, and sediment loadings.
- ◆ In 1991 - estimated total nitrogen saved = 11,144 lbs.
 - estimated total phosphorus saved = 4,458 lbs.
- ◆ In 1992 - estimated total nitrogen saved = 62,410 lbs.
 - estimated total phosphorus saved = 24,964 lbs.

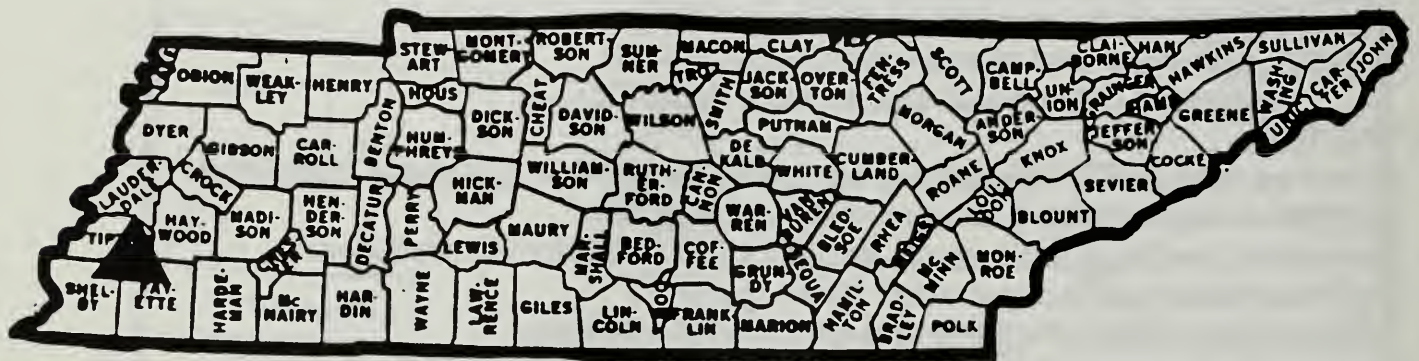
ACTIVITIES:

- ◆ Produced radio spots, newsletters, brochures, factsheets; completed Geographic Information System (GIS), all to promote water quality.
- ◆ Conducted meetings, radio spots, and tours and to inform the producers and the general public about water quality goals.
- ◆ Promoted cost share programs and conservation planning.
- ◆ Installed conservation practices such as stockwater ponds, windbreaks, fences, and land leveling.
- ◆ Implemented well water testing program.
- ◆ Conducted 3 pesticide applicator training sessions.
- ◆ Implemented nutrient, pest, and erosion control plans to reduce nutrient, and sediment loadings.

OTHER AGENCIES: Bureau of Reclamation, South Dakota Department of Water and Natural Resources, Environmental Protection Agency, U.S. Geological Survey, U.S. Corp of Engineers, South Dakota Department of Agriculture.

REPORTING & EVALUATION: Daily weather monitoring; evaluate loading of nutrients; monitor wells and gauging stations.

Tennessee



▲ North Fork/Fall Creek

STATE: TENNESSEE

PROJECT SIZE: 77,000 acres.

PROJECT NAME: NORTH FORK CREEK/FALL CREEK **STARTED:** 1990

COUNTIES IN PROJECT: BEDFORD

CROPS/LIVESTOCK: Soybeans, corn, wheat, alfalfa, tobacco, beef, dairy, poultry, and swine.

OBJECTIVES: Reduce sediment delivery; water reduce leaching of nutrients and bacteria into groundwater; determine effectiveness of Best Management Practices (BMPs) in improving surface and groundwater.

IMPACTS:

- ◆ Installed a demonstration low pressure pipe septic system on public property.
- ◆ Improved animal waste management systems on 4 dairy and 3 poultry farms including improved waste application practices.

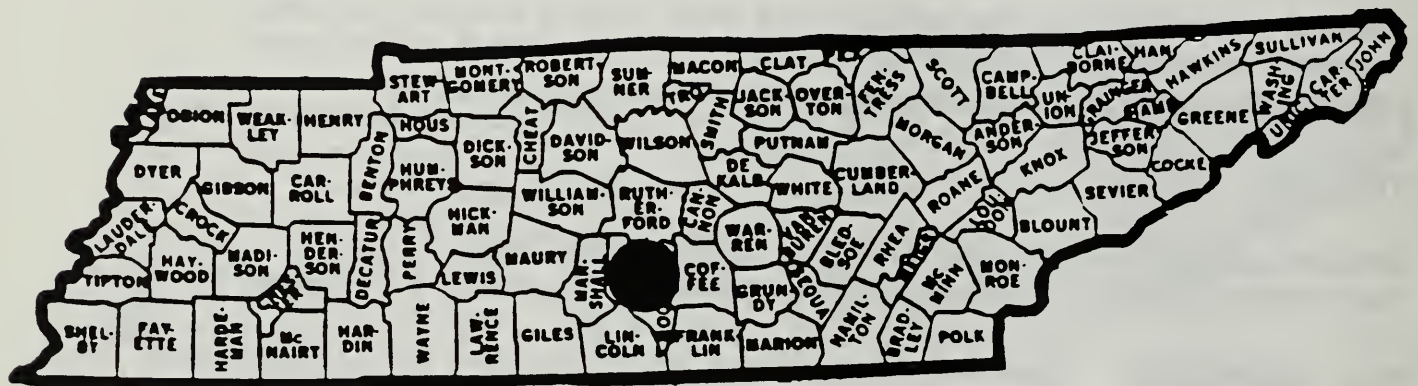
ACTIVITIES:

- ◆ 246 soil samples analyzed and fertility recommendations made.
- ◆ Field record book for Integrated Crop Management (ICM) developed and pilot tested.

OTHER AGENCIES: Tennessee Department of Environment and Conservation, Tennessee Wildlife Resources Agency, U.S. Geological Survey and Tennessee Valley Authority.

REPORTING & EVALUATION: Biological monitoring; well testing, and storm event monitoring.

Tennessee



● **Beaver Creek**

STATE: TENNESSEE

PROJECT SIZE: 95,450 acres.

PROJECT NAME: BEAVER CREEK

STARTED: 1991

COUNTIES IN PROJECT: FAYETTE, HAYWOOD, SHELBY, TIPTON

CROPS/LIVESTOCK: Cotton, soybeans, small grains, corn, wheat, beef cattle, and poultry.

OBJECTIVES: Reduce sediment, pesticide and nutrient delivery to surface water; reduce leaching of pesticides and nutrients to groundwater, verify Best Management Practice impact.

IMPACTS:

- ◆ 11,600 acres of cotton produced using integrated pest management (IPM).
- ◆ Conservation tillage of 2,928 acres has reduced erosion from 22 tons per acre to 2 tons per acre.
- ◆ Permanent Vegetative cover, winter cover crops and critical area treatment of 4,215 acres have reduced erosion to within tolerable levels.
- ◆ 10,350 acres of cotton and soybeans produced using Integrated Crop Management (ICM) practices.
- ◆ Improved crop residue management on 20,000 acres.
- ◆ Decreased pesticide use by 50% on 66 acres of cotton through banding applications.
- ◆ Decreased pesticide use by 50% on 260 acres of soybeans through banding applications.

ACTIVITIES:

- ◆ Gossym-Comax computer model is being used in cotton production.
- ◆ Two-hundred soil samples analyzed and fertility recommendations made.
- ◆ Three-hundred and twenty-six acres of former cropland planted in trees.

OTHER AGENCIES: Tennessee Department of Agriculture, U.S. Geological Survey, Tennessee Department of Health and Environment.

REPORTING & EVALUATION: Water monitoring; biological and chemical monitoring; Tennessee Aquatic Database System (TADS) for sample analysis.

STATE: TEXAS

PROJECT SIZE: 290,000 acres.

PROJECT NAME: UPPER NORTH BOSQUE **STARTED:** 1990

COUNTIES IN PROJECT: ERATH, HAMILTON

CROPS/LIVESTOCK: Pasture, peanuts, range, hay, orchard, dairy, and beef cattle.

OBJECTIVES: Reduce fecal coliform levels; accelerate pollution control practice adoption by producers, educate dairy owners and managers on water pollution problems arising from improperly designed dairy waste management systems; provide technical assistance, establish costs for dairy waste management structures.

IMPACTS:

- ◆ Installed waste management systems such as single and/or two stage lagoons, and solids settling basin have demonstrated significant reductions in nonpoint source pollutants.
- ◆ Improved systems for dairy sanitation resulted in a saving of 60 gallons of water/cow/day.
- ◆ Overseeding coastal grass with winter annuals provides year around disposal for dairy waste, while producing dry matter yields 17,000 lbs/acre/year.
- ◆ Integrated Pest Management (IPM) for house fly control in dairy barns resulted in a 91% reduction in broadcast insecticide application.

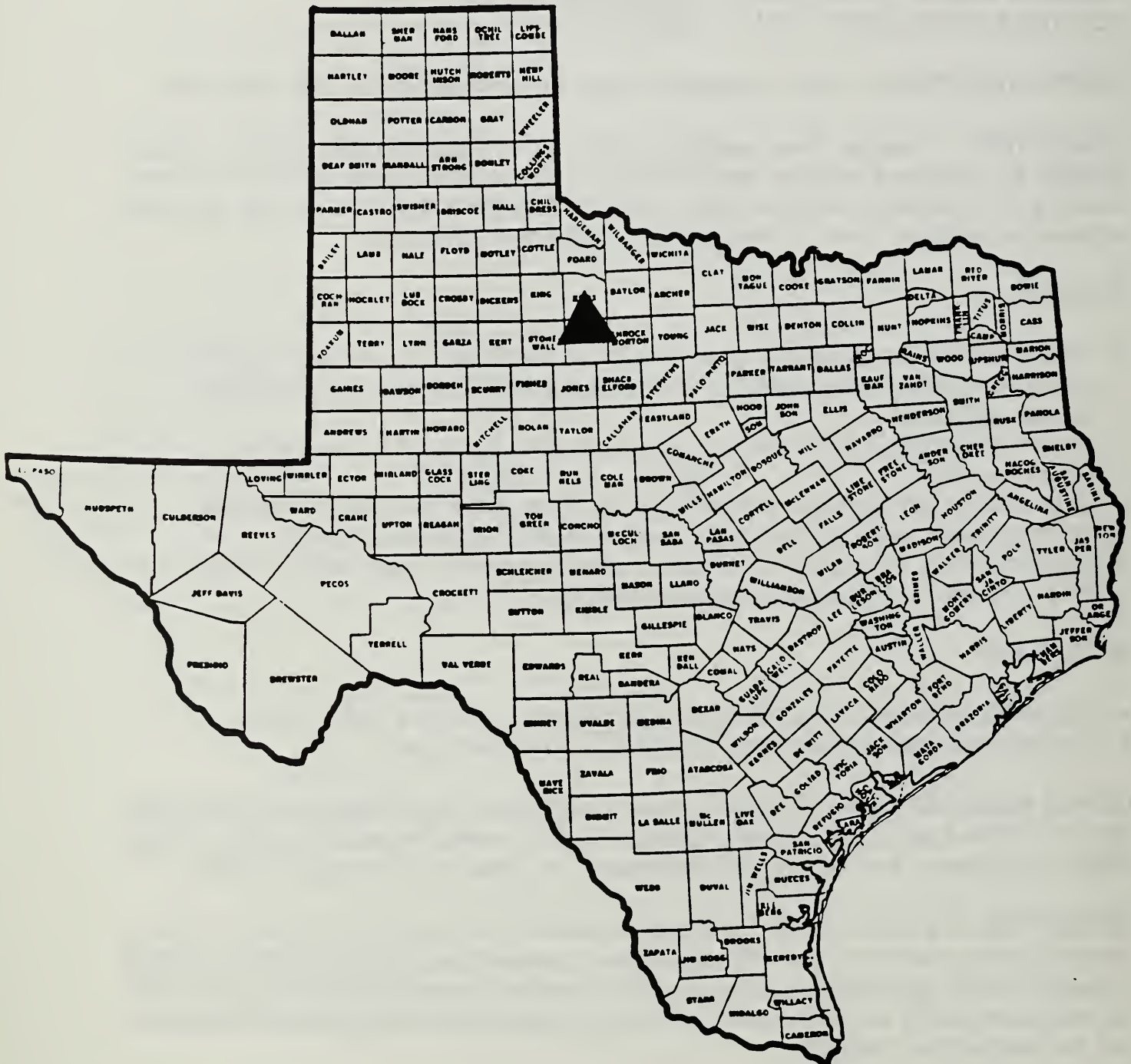
ACTIVITIES:

- ◆ Published newsletters, brochures, and factsheets to promote water quality.
- ◆ Provided pesticide applicator training (PAT) to 145 producers.

OTHER AGENCIES: Soil and Water Conservation Board, Texas Agricultural Experiment Station, USDA-Agricultural Research Service, Environmental Protection Agency, Texas Water Commission Association, Milk Producers, Inc., and U.S. Geological Survey.

REPORTING & EVALUATION: Monitor wastewater and runoff from 3 dairy farms; a program will be used to monitor concentrations of nutrients and chemical oxygen demand in runoff; monitor groundwater use and quality in relation to waste production, county data on well water quality will be compiled; sediment in impoundments and stream flood plains will be sampled and analyzed.

Texas



▲ Seymour Aquifer

STATE: TEXAS

PROJECT SIZE: 250,000 acres.

PROJECT NAME: SEYMOUR AQUIFER

STARTED: 1991

COUNTIES IN PROJECT: HASKELL, KNOX

CROPS/LIVESTOCK: Cotton, wheat, sorghum, hay, and vegetables.

OBJECTIVES: Reduce nitrates in drinking water and groundwater; reduce pesticide and bacterial contamination.

IMPACTS:

- ◆ Soil testing, banded and fertilizer applications reduced fertilizer application by 5% on 88,200 acres.
- ◆ Conservation Reserve Program implemented on 29,600 acres reduced fertilizer application by 100%.
- ◆ Cropping systems and crop residue management practices reduced fertilizer application by 10% on 16,000 acres.
- ◆ Well testing indicates nitrate levels are remaining constant.

ACTIVITIES:

- ◆ Conducted meetings, trainings, conferences, tours, surveys, workshops, and field days to promote water quality.
- ◆ Published factsheets, newsletters, news articles, brochures.
- ◆ Implemented long term agreements.
- ◆ Promoted cost share programs and conservation planning.
- ◆ Conducted a free soil testing program.
- ◆ Demonstrated irrigation management techniques such as scheduling use of flow meter, and water testing equipment.

OTHER AGENCIES: U.S. Geological Survey, Texas Forest Service, Texas Agricultural Experiment Station, Agricultural Research Service, Texas Department of Agriculture.

REPORTING & EVALUATION: Water monitoring, soil and water sample analysis, monitor nutrient and pesticide movement; well testing.

STATE: TEXAS **PROJECT SIZE: 234,300 acres.**

STARTED: 1991

COUNTIES IN PROJECT: HOPKINS, RAINS, WOOD ..

CROPS/LIVESTOCK: Wheat, oats, watermelon, sweet potatoes, dairy and poultry.

OBJECTIVES: Treat liquid wastes on-site; install animal waste management facilities; reduce nitrates, pesticides, phosphates and fecal coliform loading.

IMPACTS:

- ◆ Estimated reductions in nutrient use due to proper nutrient management are as follows: N= 3,753 lbs, P₂O₅ = 5,863 lbs, K₂O = 10,056 lbs.
- ◆ Reduced pesticide use as follows-aldicarb 1,194 lbs/active ingredient, chlorpyrifos-806 lbs/active ingredient, Flauzifop=P Butyl 310 lbs/active ingredient.

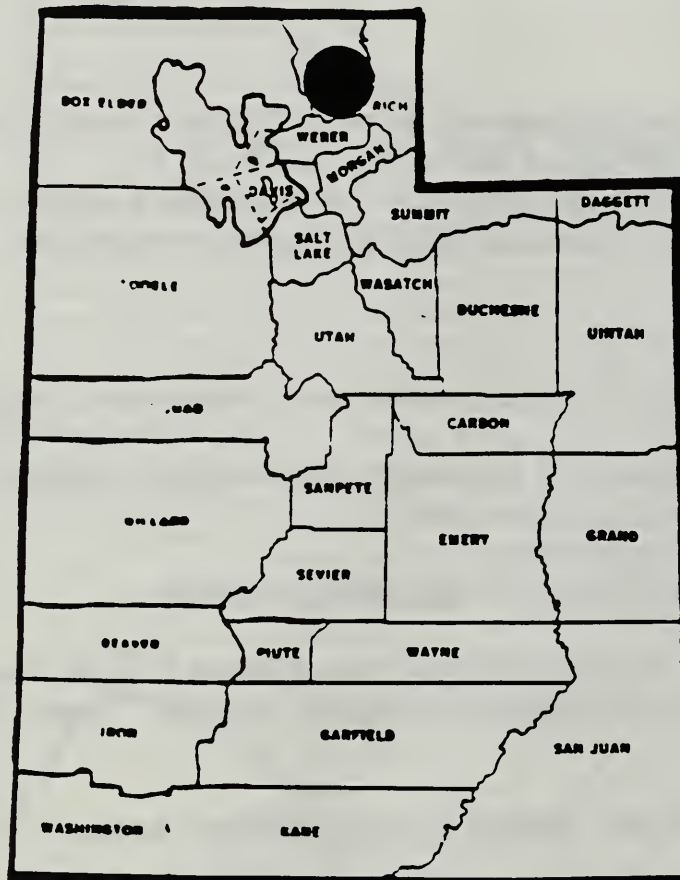
ACTIVITIES:

- ◆ Conducted meetings, tours, seminars, workshops, conferences, training programs to promote water quality.
- ◆ Published brochures, newsletters, factsheets, news articles, mailings, to inform the public and farmers about the project goals.
- ◆ Implemented long term agreements.
- ◆ Promoted conservation planning and cost share programs.

OTHER AGENCIES: U.S. Geological Survey, Texas Forest Service, Texas Agricultural Experiment Station, USDA-Agricultural Research Service, Texas Department of Agriculture.

REPORTING & EVALUATION: Monitor soil and sediment; evaluate runoff, economic analysis; STANNAS.

Utah



● Little Bear River

STATE: UTAH
PROJECT NAME: LITTLE BEAR RIVER
COUNTIES IN PROJECT: CACHE

PROJECT SIZE: 197,000 acres.
STARTED: 1990

CROPS/LIVESTOCK: Irrigated corn, alfalfa, hay, pasture, and beef cattle.

OBJECTIVES: Reduce sediment and nutrient inputs; create quality fishery; reduce impacts from livestock grazing.

IMPACTS:

- ◆ Livestock exclusion from 100 acres has improved.
- ◆ Installed sprinkler systems with expected 50% reduction in contaminants leaching through the root zone.
- ◆ Fencing of livestock has improved grazing management of 3,180 feet.

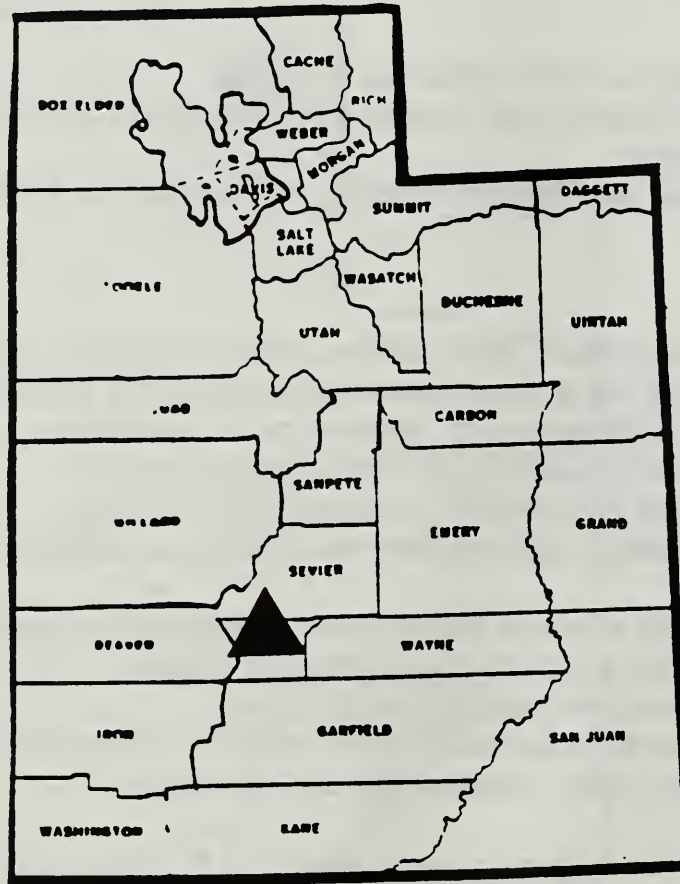
ACTIVITIES:

- ◆ Used newspaper, television, news articles, radio broadcast, slide presentation to create public awareness about water quality concerns in the watershed.
- ◆ Conducted tours, presentations to increase public awareness.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Conducted workshop on Pollution prevention to 4-H Youth.
- ◆ 1,500 5th grade students and teachers attended a workshop on pollution prevention.
- ◆ One-on-one contacts made to 100 landowners on water conservation plans.
- ◆ Installed conservation practices on streambank erosion.
- ◆ Implemented nutrient management on 632 acres.
- ◆ Completed agricultural conservation practice (ACP) contracts on 40 farms.
- ◆ Completed irrigation water management on 145 acres.

OTHER AGENCIES: Utah Department of Health, U.S. Dept. of Interior, U.S. Geological Survey, and U.S. Forest Service.

REPORTING & EVALUATION: Evaluate rangeland condition; evaluate streambank/channel erosion samples taken to test for coliform count and nutrient content, monitor point sources of pollution.

Utah



▲ **Otter Creek/Koosharem**

STATE: UTAH

PROJECT SIZE: 240,000 acres.

PROJECT NAME: OTTER CREEK/KOOSHAREM

STARTED: 1991

COUNTIES IN PROJECT: PIUTE, SEVIER

CROPS/LIVESTOCK: Alfalfa, small grains, pasture, hay, beef, sheep, horses, wildlife - elk, deer, antelope, geese, and ducks.

OBJECTIVES: Reduce erosion; reduce levels of phosphorus, sediment, nitrates, and coliform counts.

IMPACTS:

- ◆ Installed sprinkler systems with expected 50% reduction in contaminants leaching through the root zone.
- ◆ Nutrient loading is at acceptable levels.
- ◆ Level of awareness of watershed problems among producers is high.
- ◆ Agricultural producers within the watershed are interested and willing to change management practices to reduce sediment/nutrient loading.

ACTIVITIES:

- ◆ Conducted tours, and meetings to promote water quality in watershed.
- ◆ Published news articles and brochures to promote project goals.
- ◆ Implemented long term agreements.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Planned and implemented cost share practices.
- ◆ Installed 2,800 acres of streambank protection.
- ◆ Installed 200 acres of pasture management.

OTHER AGENCIES: Department of Health, Utah Department of Agriculture Utah Parks & Recreation, Bureau of Land Management, and U.S. Forest Service.

REPORTING & EVALUATION: Water sampling in the creek; and macroinvertebrate studies.

Vermont



● Lower Missisquoi

STATE: VERMONT
PROJECT NAME: LOWER MISSIQUOI
COUNTIES IN PROJECT: FRANKLIN, LAMOILLE

PROJECT SIZE: 247,000 acres.
STARTED: 1990

CROPS/LIVESTOCK: Corn, alfalfa, hay, pasture, beef, dairy, and beef cattle.

OBJECTIVES: Minimize agricultural impacts on surface and groundwater quality by improving management of crops, soils, and agricultural wastes; evaluate selected nutrient and pesticide Best Management Practices (BMPs); develop a public information and education program on improving water quality; survey groundwater within the project area by testing private wells.

IMPACTS:

- ◆ Nutrients applied according to recommendations.
 - manure applied at or below recommended rate on 74% of crop acreage
 - phosphorus fertilizer applied at or below recommended rate on 66% of crop acreage
- ◆ Documented reductions in nutrient loading and fertilizer expense on some farms, (e.g. 76 lb/acre reduction in both N and P₂ O₅ on corn on one farm).

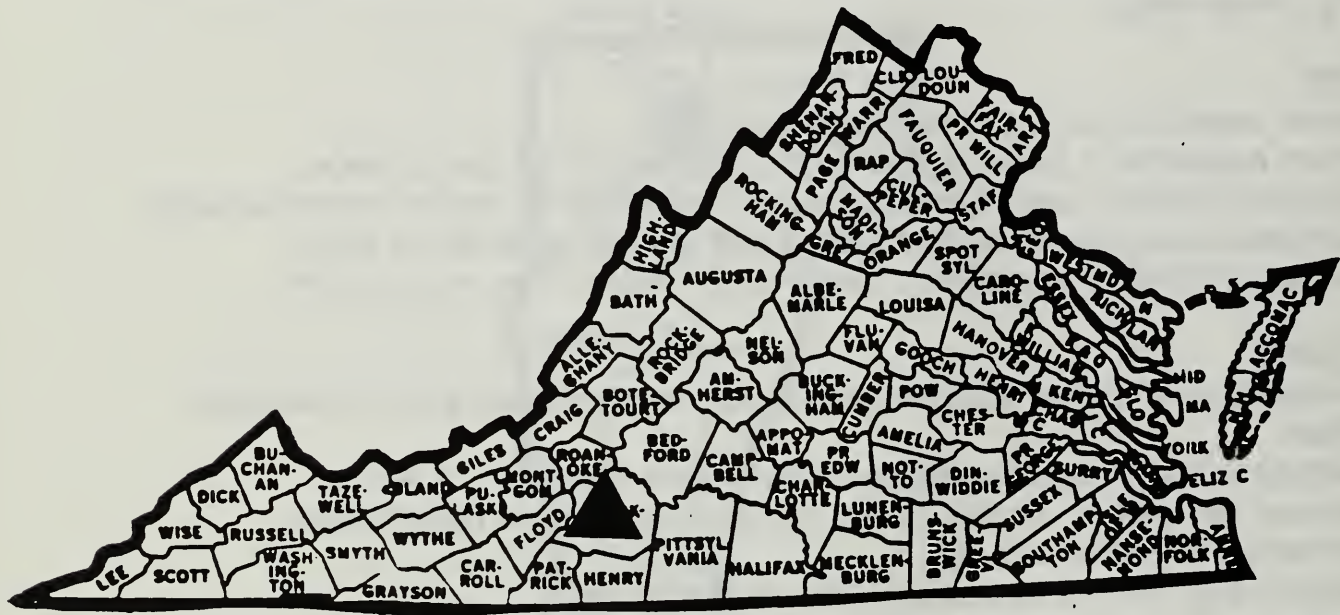
ACTIVITIES:

- ◆ Cost-shared and installed animal waste storage structures and other conservation practices.
- ◆ Developed long term agreements and conservation plans on 117 farms.
- ◆ Developed fact sheets, mailing list and brochures to promote project goals.
- ◆ Implemented well water testing.
- ◆ Developed crop nutrient budget and manure testing kits.
- ◆ Constructed 55 waste storage facilities, 46 livestock concentration areas, and 29 milkhouse waste facilities in 1990-92.
- ◆ Developed Integrated Crop Management (ICM) plans for 12 farms (4-5% of watershed farms)
- ◆ Completed inventory of farms in watershed, including an estimate of their phosphorus loading.
- ◆ Conducted workshops and farm tours for farmers, for vocational education teachers for high school students, and for home gardeners; mass media (new releases, radio, TV); bimonthly newsletter; poster display used at fairs and conferences; fact sheets on manure management and spreader calibration.

OTHER AGENCIES: Vermont Department of Agriculture, U.S. Fish, and Wildlife Service.

REPORTING & EVALUATION: Track BMP adoption; survey farmers; evaluate BMPs; use models to estimate trends in nutrient loadings; maintain computerized crop records; monitor well water and use models to assess risk of nitrate leaching.

Virginia



▲ **Blackwater River**

STATE: VIRGINIA
PROJECT NAME: BLACKWATER RIVER
COUNTIES IN PROJECT: FRANKLIN

PROJECT SIZE: 176,000 acres.
STARTED: 1991

CROPS/LIVESTOCK: Tobacco, row crops, pasture, hay, dairy, beef, and horses.

OBJECTIVES: Reduce sediment and nutrient loadings.

IMPACTS:

- ◆ Reduced nitrogen application by 45 lbs/ac/year for ground-surface water.
- ◆ Reduced phosphorus application by 34 lbs/ac/year for ground-surface water.
- ◆ Applied erosion and sediment control practices on 1,593 acres.

ACTIVITIES:

- ◆ Conducted workshops, training, meetings, tours, one-on-one visits, field days to promote water quality and waste management.
- ◆ Published newsletters, news articles, brochures and fact sheets.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Implemented nutrient management practices.
- ◆ Established long term agreements.
- ◆ Installed animal waste storage facilities, rotational pastures, and improved cattle loses.
- ◆ Demonstrated practices such as terraces, strip cropping, and filter strips, rotational loafing lots, cattle stream crossings.

REPORTING & EVALUATION: Water sampling, and on-site evaluation.

OTHER AGENCIES: Environmental Protection Agency , the Virginia Division of Soil & Water Conservation, U.S. Geological Survey, Blue Ridge Soil and Water Conservation District, Virginia Water Control Board.

Washington



▲ Granger Drain

STATE: WASHINGTON
PROJECT NAME: GRANGER DRAIN
COUNTIES IN PROJECT: YAKIMA

PROJECT SIZE: 12,359 acres.
STARTED: 1991

CROPS/LIVESTOCK: Corn, pasture, asparagus, alfalfa, grapes, mint, orchards, wheat, beef, and dairy cattle.

OBJECTIVES: Reduce sediment and nutrient loadings; reduce bacterial level to the Yakima River.

IMPACTS:

- ◆ Reduce of surface runoff by installing sprinklers on 137 acres.
 - increased water savings by efficient irrigation
 - reduced in sediment and nutrient loading.
- ◆ Improved nutrient management capability of 3 dairies with constructing of dairy waste lagoons.
- ◆ Reduced nitrogen loss from 7 dairies by developing nutrient management plans (3,117 acres and 460,00 lbs N).
- ◆ Reduced nitrogen loading on 272 acre of silage corn by soil testing and manure analysis.

ACTIVITIES:

- ◆ Published articles, newsletters, and factsheets to promote water quality.
- ◆ Conducted meetings, tours, and field days to promote project goals.
- ◆ Designed demonstration projects to support producer adoption of conservation practices.
- ◆ Implemented long term agreements.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Implemented nutrient management plans to address landusers' needs.

OTHER AGENCIES: Environmental Protection Agency, U.S. Geological Survey, Yakima County Health Department, U.S. Bureau of Reclamation.

REPORTING & EVALUATION: Water sampling, and data collection.

West Virginia



● Greenbrier River

STATE: WEST VIRGINIA
PROJECT NAME: GREEBRIER RIVER
COUNTIES IN PROJECT: GREENBRIER

PROJECT SIZE: 261,406 acres.
STARTED: 1990

CROPS/LIVESTOCK: Hay, grain, pasture, tobacco, beef, dairy, poultry, swine, and turkey.

OBJECTIVES: Reduce fecal coliform bacteria and levels of nitrates in wells; improve manure management; control erosion and sediment.

IMPACTS:

- ◆ Reduced nitrogen application for ground-surface water by 20 pounds per acre per year.
- ◆ Reduced phosphorus application for ground-surface water by 80 pounds per acre per year.
- ◆ Reduced pesticide use 10-20%.

ACTIVITIES:

- ◆ Implemented crop management program by promoting manure testing, pesticide applicator training (PAT).
- ◆ Implemented long term agreements which will result in reduced nutrient loading.
- ◆ Established a nitrogen response trial to show reliability of soil nitrate test.
- ◆ Installed watering facilities.
- ◆ Promoted conservation planning and cost share programs.
- ◆ Recommendations for less nutrients and pesticides due to the ICM program.
- ◆ Conducted nitrogen/manure/sludge demonstrations.

OTHER AGENCIES: U.S. Geological Survey and Agricultural Research Service.

REPORTING & EVALUATION: Mathematical modeling will be used to assess impacts of land use and practices.

● Stevens Point/Plover/ Whiting Wellhead Area

STATE: WISCONSIN

PROJECT SIZE: 71,000 acres.

PROJECT NAME: STEVENS POINT/WHITING/

STARTED: 1990

PLOVER WELLHEAD PROTECTION

COUNTIES IN PROJECT: PORTAGE

CROPS/LIVESTOCK: Irrigated potatoes, snapbeans, peas, sweet corn, field corn, dairy, and beef cattle.

OBJECTIVES: Reduce excessive leaching of nitrates and pesticides to groundwater; expand the adoption of Integrated Crop Management (ICM) among farmers on 75% (approximately 19,500 acres) of the cropland acres; accelerate adoption of Groundwater Smart* practices by farmers and homeowners.

IMPACTS:

- ◆ Applying ICM practices, farmers reduced nitrogen applications by 28,000 pounds, phosphorus (P_2O_5) applications by 46,000 pounds and potassium (K_2O) applications by 123,000 pounds.
- ◆ Economic savings due to reduction in nutrients saved farmers nearly \$20,000 in input costs.
- ◆ \$11.35 per acre savings over 2800 acres.

ACTIVITIES:

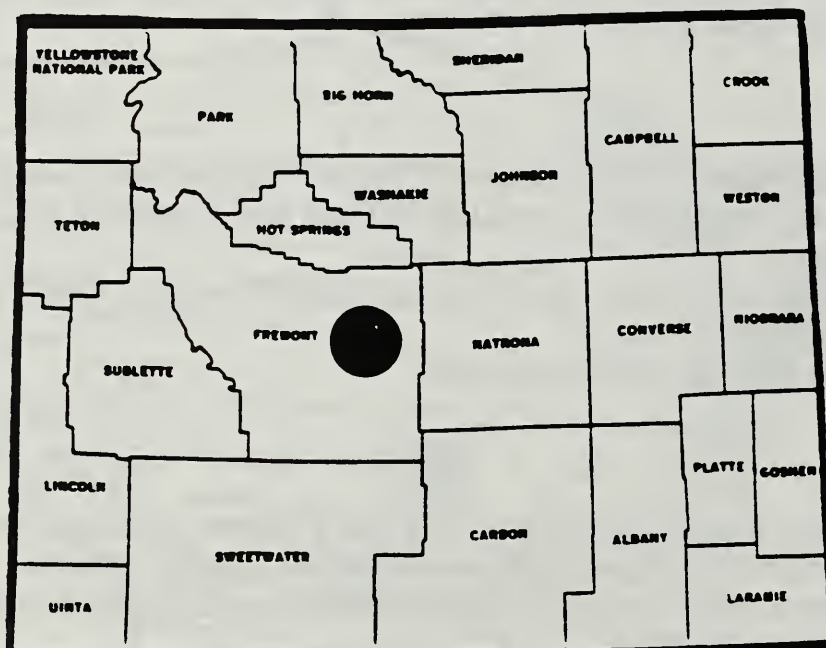
- ◆ Implemented long term agreements for ICM on 17 farms covering over 2,800 acres; significant agronomic, economic and environmental benefits occurred as a result.
- ◆ Implemented five farm tours/demonstrations addressing ICM, irrigation scheduling, fuel storage and manure handling.
- ◆ Developed a video on "properly abandoned well techniques" which can be used by well owners.

OTHER AGENCIES: Agricultural Research Service, Resource Conservation District, Wisconsin Department of Natural Resources, and Portage County Planning and Zoning.

REPORTING & EVALUATION: Data collected from water samples, Nitrate Leaching and Economic Analysis Package (NLEAP) computer program to be used for modeling; utilize Farmstead Assessment System (Farm *A*Syst), and use of Field Practices Inventory Survey.

*Smart - Sustaining and Managing Agricultural Resources for Tomorrow.

Wyoming



● Ocean Lake

STATE: WYOMING
PROJECT NAME: OCEAN LAKE
COUNTIES IN PROJECT: FREMONT

PROJECT SIZE: 168,370 acres.
STARTED: 1990

CROPS/LIVESTOCK: Alfalfa, hay, small grains, pasture, corn, sugarbeets, dairy, and sheep.

OBJECTIVES: Accelerate implementation of agricultural Best Management Practices (BMPs) and off-farm rehabilitation to improve water quality in the project. Goals include reducing sediment loading to the lake, providing technical and cost-share assistance, conducting information/education, research and demonstration activities in support of the overall effort.

IMPACTS:

- ◆ Adoption of proven BMPs and technology have resulted in water savings, better crop quality, uniformity, and yields.
- ◆ Demonstrations have shown water savings of as much as 50% and a decreased crop nitrogen requirements (due to better efficiency and uniformity of application) of about 30%.
- ◆ Positive changes in agrichemical usage and fertigation are being adopted more readily.
- ◆ Higher level of awareness about agricultural nonpoint source pollution.
- ◆ Increased wildlife habitat in irrigation drains attracts additional public support for the project.

ACTIVITIES:

- ◆ Developed slide shows, video clips, radio shows, newspaper articles about the watershed and project.
- ◆ Developed and distributed surge valves.
- ◆ Developed better understanding and relations with neighboring Indian Tribes relative to the project.

OTHER AGENCIES: Midvale Irrigation District, Save Ocean Lake Committee, Fremont County Commissioners, Town of Pavillion, Fremont County Recreation Commission, Wind River Recreation Board, Wyoming Department of Environmental Quality, Wyoming Game and Fish Department, U.S. Geological Survey, U.S. Bureau of Reclamation, Wyoming Department of Agriculture, Wyoming Water Development Commission, Wyoming State Engineer's Office, University of Wyoming (UW) Water Resources Center, UW Agricultural Experiment Station, Environmental Protection Agency, U.S. Fish and Wildlife Service.

REPORTING & EVALUATION: Baseline and mid-term water quality data are being developed by the University of Wyoming, on contract with Wyoming SCS. Sampling and analytical protocol established in this study will be considered in ongoing.

Wyoming

1. The purpose of this document is to provide a comprehensive overview of the state of Wyoming, including its history, geography, and current status.

Wyoming is a state in the western United States, known for its vast, open spaces and natural beauty. It is the only state that is entirely landlocked, and it is the only state that is entirely within the Rocky Mountain region.

Category	Item	Value
Area	Total Area	97,813 square miles
Area	Land Area	94,310 square miles
Area	Water Area	3,503 square miles
Population	Population (2020)	576,851
Population	Population Density	5.9 people per square mile
Government	Governor	Mark Gordon
Government	Attorney General	Jeffrey B. Sessions
Government	Comptroller	David L. Williams
Government	Secretary of State	Matthew Meeks
Government	Commissioner of Education	Debra L. Jordan
Government	Commissioner of Health	David L. Williams
Government	Commissioner of Natural Resources	David L. Williams
Government	Commissioner of Transportation	David L. Williams
Government	Commissioner of Veterans Affairs	David L. Williams
Government	Commissioner of Wildlife	David L. Williams
Government	Commissioner of Youth Services	David L. Williams
Government	Commissioner of Corrections	David L. Williams
Government	Commissioner of Mental Health	David L. Williams
Government	Commissioner of Substance Abuse	David L. Williams
Government	Commissioner of Social Services	David L. Williams
Government	Commissioner of Public Safety	David L. Williams
Government	Commissioner of Emergency Management	David L. Williams
Government	Commissioner of Disaster Preparedness	David L. Williams
Government	Commissioner of Disaster Response	David L. Williams
Government	Commissioner of Disaster Recovery	David L. Williams
Government	Commissioner of Disaster Mitigation	David L. Williams
Government	Commissioner of Disaster Prevention	David L. Williams
Government	Commissioner of Disaster Preparedness	David L. Williams
Government	Commissioner of Disaster Response	David L. Williams
Government	Commissioner of Disaster Recovery	David L. Williams
Government	Commissioner of Disaster Mitigation	David L. Williams
Government	Commissioner of Disaster Prevention	David L. Williams

Wyoming is a state with a rich history and a strong sense of community. It is a state that is proud of its heritage and its natural resources. It is a state that is committed to the well-being of its citizens and to the preservation of its environment.

Wyoming is a state that is full of life and opportunity. It is a state that is full of people who are proud of their home and who are committed to making it a better place for everyone.

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